THE OIL WEEKLY

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The Oil Man's Calendar

MAR.	
15-17	**Society of Exploration Geophysicists, New Orleans.**
16-18	**American Association of Petroleum Geologists, New Orleans.**
21-25	**Western Metal Congress, Biltmore Hotel, Los Angeles.**
23-25	**American Society of Mechanical Engineers, Los Angeles, Calif.**
24-25	**Southwestern District, A.P.I., Spring Meeting, Fort Worth, Texas.**
APR.	
13-15	**Petroleum Industry Electrical Association, Rice Hotel, Houston.**
13-15	**National Petroleum Association, Cleveland, Ohio.**
14-15	**A.P.I., Eastern District, Division of Production, William Penn Hotel, Pittsburgh, Pennsylvania.**
19	**A.P.I., Division of Production, Pacific Coast District, Spring Meeting, Biltmore Hotel, Los Angeles.**
19	**Western Petroleum Refiners Association, Hot Springs, Arkansas.**
MAY	
6-12	**American Gas Association, Natural Gas Department, New Orleans, La.**
11-13	**Natural Gasoline Association of America, Hotel Tulsa, Tulsa.**
12-14	**National Oil Scouts Association of America, Tulsa, Oklahoma.**
14-21	**International Petroleum Exposition, Tulsa, Oklahoma.**
23-25	**A.P.I., Mid-Year Meeting Wichita, Kansas.**
JUNE	
4	**Illinois-Indiana Petroleum Association, Sixth Annual Conference, Robinson, Illinois.**

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LOOKING AHEAD

WITH THE EDITOR

New Gaugers Code . . .
Wrinkle Bending of Pipe . . .
New Fishing Methods . . .

IT is safe to say that many a gauger will inspect his own kit and many a superintendent will inspect many a gauger's kit—and probe into his methods—after reading Otto Stallard's "Measuring, Sampling and Testing Crude Oil" in a forthcoming issue. The author tells how it is done in the Mid-Continent to comply with A.P.I. Code 25. He displays a drawing of a gauger's kit that is a dilly. But it is only one of more than 20 illustrations accompanying the text. The article covers the subject thoroughly. You'll find it worth filing.

SOME of the new field practices and methods are so simple and effective one wonders why they were not adopted for widespread use years ago. "Wrinkle bending" pipe comes under this heading. And the simplicity and effectiveness of the outdoor, on-the-job method is proving a boon to those active in laying overland lines, particularly in regions of irregular and rapidly rising and falling contours. An early issue of The OIL WEEKLY will carry a pictorial article dealing with application of "wrinkle bending" to line problems.

"FISHING for stuck tubing or tubing catchers is the most feared job in the production department," says Joe Chastain, who then goes ahead and tells about a new successful method for getting over that hurdle in an article in an early issue of THE OIL WEEKLY. He put a well back on the pump in four days after having lost 6480 feet of 2½-inch tubing. Excessive weight had caused the tubing catcher to hang so it could not be pulled. Cost of the job—labor, tool rental and all — amounted to only $1600.

The changing panorama

CONDITIONS in the oil industry remain comparatively good, and the prevailing sentiment is one of hopefulness.

This sanguine spirit is being reflected currently in the annual statements that the heads of oil companies are sending out to stockholders. The executives have pointed out that the business slump has had a retarding effect in the oil industry, and that the industry should keep close watch over the relatively favorable position that it occupies. But, in most instances, these leaders in the industry are distinctly hopeful, and some have expressed anticipation that 1938 will prove comparatively good.

Situation Relatively Good

Encouragement has been offered lately by the more favorable trends of the oil industry's markets. From well to service station, prices in the industry now are comparatively stable. And most of the circumstances indicate that prices may be expected to continue steady in coming weeks.

For crude oil production again will be held down strictly during March, under the desirable allowables in the leading producing states. And operations at refineries also are being held in close conformity with market requirements.

Gasoline Stocks Too High

It is true that gasoline stocks are too high, having increased another 1,000,000 barrels to a new all-time peak of 90,719,000 barrels in the week ended February 26.

But there has been some slowing down of additions to gasoline storage, and the stocks now are not quite as far out of line with market demand as in some recent weeks.

Nevertheless, the gasoline stocks are excessive, and there is need for further special efforts to hold them down. The gasoline stocks now are 18.4 percent larger than at this time last year, but gasoline demand is running only slightly higher.

Special Curtailment Needed

Recent hearings, in preparation for adopting March allowables, furnished proof of the need for strict control of crude oil production in Oklahoma and Kansas. It was indicated that in both of those states the crude oil markets are relatively weak, as the purchasers made known the desire to purchase even less than the Bureau of Mines' estimate of demand.

Guided by the nominations of the purchasers, the Oklahoma conservation officials prescribed a state allowable for March about 75,000 barrels a day less than the Bureau of Mines' suggestion. In Kansas, the purchasers indicated willingness to purchase only about 166,000 barrels daily, whereas the Bureau of Mines had estimated the demand in the state in March at 176,700 barrels daily. The allowable finally was set at 169,528 barrels daily.

It is indicated, moreover, that the crude oil market in the East Texas field is somewhat unstable; and there have been some fears that the East Texas posting of $1.35 a barrel might be reduced.

Despite the evidence that the crude oil market is relatively weak in various districts, it is generally hoped that the established crude price postings can

The Lisbon field, one of the more important newer discoveries in the Ark-La-Tex area, was discovered by a former big league ball player, E. T. (Rebel) Oakes. Part owners in some of its leases are Amos-N-Andy of radio fame, Frank Morgan and Ralph Bellamy. They are associated with Harry Hanbury and Tip DeArmand.

Lisbon at present covers 4000 acres, but has not been defined. A total of 173 wells have been completed.

be maintained. And this hope is bolstered by the plans of the leading oil producing states to continue the strict control of production during March.

Oil Industry Employment Holding Up

In its monthly survey for January, the Bureau of Labor Statistics revealed that employment in the petroleum industry has been holding up better than in business in general.

In the producing division of the petroleum industry, employment in January was 4.2 percent higher than in January of last year. In contrast, there were January-to-January decreases in almost all of the other 15 non-manufacturing industries included in the survey. Pay rolls in the producing division, in January, were 11 percent higher this year than last year.

In the refining department of the industry, employment in January was six-tenths of 1 percent smaller than in January, 1937, according to the report. But January employment in all manufacturing industries was 14 percent smaller in January, 1938, than in January, 1937. The pay rolls in the refining division of the oil industry were 14.8 percent higher in January, 1938, than in January, 1937; whereas, the pay rolls for all manufacturing industries were 19.8 percent below a year ago.

Washington Notes Texas Over-Production

Fears that Texas production may get out of hand and precipitate a new crisis are voiced in complaints of over-production which are reaching the Interior Department, where they are being referred to the Attorney General for investigation and such proceedings as the Department of Justice may deem appropriate.

The Texas situation is tied up with the national picture, the weekly stock report of the Bureau of Mines for the period ended February 19 showing that production is increasing while runs to stills remain constant. The report also shows that during that week national stocks increased by 304,000 barrels, the same amount by which stocks of East Texas crude increased in the same period.

What the Department of Justice can do in the situation is still problematical. However, Secretary Ickes said, he has no intention at this time of asking Congress for further control legislation.

Thumbs Down on Tidelands Seizure

Members of the House Judiciary Committee are believed to oppose the Nye resolution authorizing the Department of Justice to attempt to seize the California off-shore oil fields in the name of the United States.

As rewritten in accordance with recommendations of the Justice, Interior and Navy Departments, the resolution, originally confined to California, would apply to the entire coast line. Committee members are represented to feel that some other approach to the problem is preferable to enactment of the resolution, which would cast a cloud upon the title to submerged lands along every mile of our coasts.

Drilling

A WILDCAT on the Thornton faulted structure in Limestone County wrote a new chapter to the East Texas Woodbine basin history when it penetrated 655 feet of salt. Value of the recently discovered Flag Lake structure in northwestern Henderson County was enhanced by completion of a second prolific high gravity well in the Woodbine.

An eastern Colorado wildcat is acidizing after coring saturation in the upper part of the Shawnee lime. Another, 13 miles northeast of Casper, Wyoming, on the Cole Creek structure, is preparing to test shows of oil encountered above 6800 feet.

Developments in New Mexico indicate Vacuum pool will be the busiest in Lea County soon. An eastern outpost completion of the week flowed 85 barrels per hour. It looks as though Langlie's sandy lime area may be extended 2¾ miles southeast.

Fayette County may be included among the productive counties in Illinois. A wildcat there cored saturation. Seneca County, Ohio, apparently will contribute a new deep sand for the old Lima field.

In the Texas Gulf Coast, a wildcat a mile south of McCrosky in Matagorda County prepares for a production test. The area recorded minor extensions also.

South Louisiana recorded the discovery of a new sand at Jennings, at North Crowley and at Lake Hermitage.

Southwest Texas reported new sands and extensions. Stratton, South Clara Driscoll and Mirando Valley fields chalked up new sands. Turkey Creek and Maetze fields recorded half mile extensions.

Market briefs

Outlook—Continued favorable conditions promised.

Crude Markets—Prices holding.

Refined Oil Markets—Prices of most products steady.

CURRENT OPERATIONS

Week Ended	Daily Crude Production	Daily Crude Runs to Stills
February 26...	3,322,800	3,170,000
Previous week.	3,369,250	3,150,000
Year ago.....	3,296,100	3,085,000

CRUDE STOCKS

Date	Crude Oil (Barrels)
February 12.....	304,915,000
Week ago.....	304,286,000
Year ago.....	286,158,000

REFINED OIL STOCKS

Date	Gasoline (Barrels)	Gas & Fuel Oil (Barrels)
February 26...	90,719,000	120,958,000
Week ago.....	89,774,000	119,948,000
Year ago.....	76,616,000	99,176,000

DRILLING

Period	Wells Completed
Past week.....	458
Previous week.....	467
Year ago.....	516
Year Total:	
This year.....	4,569
Last year.....	4,495

Technology

IF you expect to keep the tops of your tanks clean, you should give considerable thought to the placing of hatches, flow lines, test lines and treater lines. In this issue, page 17, appears a thorough discussion, with numerous illustrations, of improvements which if made when tanks are installed would eliminate many disadvantages. It is written by a man with much tank gauging experience, Otto D. Stallard, Jr.

While all oil men are somewhat familiar with the results of seismic reflection shooting, one of the geophysical methods applied successfully in locating favorable subsurcase structure, there are many who have little conception of the various steps taken in such work. There have been highly technical discussions of these different phases, but there has never been a story written for the layman. Therefore, of interest, is the pictorial story of seismic reflection work from start to finish, which appears on page 40.

"The How and Why of Oil Well Shooting" is the subject of an article by Paul F. Lewis on page 45. The art of blasting has kept in step with progress in other branches, and these new developments are discussed, along with the presentation of valuable basic safety rules governing the shooting of wells.

Now is the time of the year when everyone is concerned with income tax reports. A handy work sheet for computation of income taxes of concerns operating in the Mid-Continent, which appears on page 60, therefore is of interest and much value.

Oil at the Capitols

House opposes federal ocean ownership . . May lift hot oil taxes . . . Ickes asks investigation of Texas production situation . . . California special session

THE scene in Washington last week was headlined by two important oil matters. Crude oil prices and their relationship to gasoline prices continued to be discussed, with Secretary Ickes asking the Department of Justice to investigate the situation, after having charged at a press conference that excess gasoline output and not the Connally act or state regulations were causing the difficulty.

Meanwhile, there were indications that members of the House Judiciary Committee were opposed to enactment of the Nye resolution, which would pass title to off-shore oil fields to the federal government. This act, which was passed by the Senate last August, was being advocated for the purpose of establishing such production as a naval petroleum reserve.

Proposal that so-called "hot oil" taxes, imposed originally to finance administrating of the NRA petroleum code, be eliminated was another Washington development of the week.

Meanwhile, there arose possibilities that Illinois may impose a state tax on oil.

House committee opposes Nye bill

Members of the House Judiciary Committee this week were seen as opposed to enactment of the Nye resolution authorizing the Attorney General to assert the title of the Federal Government to the California off-shore oil field, on which extensive hearings were held last month.

Probably not more than two or three members of the committee are in favor of the resolution, which was approved by the Senate last August after brief hearings and even shorter discussion.

Opposition to the legislation, as voiced before the House committee during its hearings, was less concerned with the California situation than with the possibilities that the measure, expanded by recommendations of the Navy and Interior Departments, would cloud title to off-shore lands along the entire coast line, including the million acres of potential oil lands off the coast of Texas and large areas off the coasts of Louisiana and Mississippi.

The legislation was initiated with a view to giving the Navy Department the California submerged field as a naval reserve. Apparently to prevent a defense in court proceedings that the legislation was discriminatory in that it applied to but a small part of the off-shore waters, the resolution was rewritten so as to cover all areas of the Atlantic, Pacific and Gulf Coasts between low-water mark and the three-mile limit, arousing the opposition not only of the Gulf oil states but also of the Atlantic states, which have millions of dollars of water-front improvements which would be affected.

Members of the Judiciary Committee generally are believed to feel that the Department of Justice already has the necessary authority to bring suits to test the question of ownership of these lands, and are reluctant to approve the Nye resolution, which would give to such litigation the weight of a Congressional pronouncement which might or might not be valid.

Propose hot oil tax elimination

Elimination on June 30, next, of the so-called "hot oil" taxes of the current revenue act is proposed by the House Ways and Means Committee in its tax revision bill, reported to the House March 1.

These taxes, imposed originally under the Revenue Act of 1934, have no relation to the import taxes of the Revenue Act of 1932, but were designed to finance the cost of administering the NRA petroleum code and, following the invalidation of the NRA, the operation of the Federal Tender Board.

The committee pointed out that the two taxes, one on production and the other on the sale and refining of crude, are now levied at a rate of 1/25 of a cent per gallon, each, and yield annually only about $894,000.

Officials of the Interior Department, commenting upon the taxes last year during hearings on continuation of the Connally contraband oil act, explained that the taxes were not necessary for financing the administration of that law and amounted to much more than the expenses of the Petroleum Conservation Division, for which the appropriation bill for the coming year provides only $250,000.

Repeal of the taxes was recommended in conformity with the Ways and Means Committee's policy of eliminating levies which return only small amounts to the Treasury and which are administratively troublesome.

Ickes asks for crude production investigation

Department of Justice investigation of the oil production situation in Texas was asked of Attorney General Homer Cummings this week by Secretary of the Interior Harold L. Ickes, as a result of a new flood of complaints of overproduction.

Discussing the situation at a press conference March 1, Ickes admitted that the situation is causing concern and explained that he has referred complaints to the Department of Justice, although he would not say what action is expected.

The weekly stock report of the Bureau of Mines showed that available supplies of East Texas crude increased 304,000 barrels between February 12 and February 19, on the latter date amounting to 126,594,000 barrels. The gain in East Texas stocks was exactly the amount by which national stocks increased over the week, it was shown. National daily production for the week ended February 19 was 3,375,000 barrels, an increase of 45,000 barrels over the preceding week; daily runs to stills, however, remained constant at about 3,150,000 barrels.

Many complaints of overproduction have been received at the department, Ickes said, and a number of Texas operators have made personal calls to discuss the situation.

Suggestions have been made that further Federal regulation be imposed, but, the Secretary pointed out, "the things they ask cannot be done without additional legislation."

The department at this time has no intention of asking for further legislation, although Ickes added, he is ready at any time to furnish such information and suggestions as members of Congress may call for.

Excess output, not Connally Act, causing gasoline trouble

The difficult position of the independent refiners, which has resulted in the closing of a number of plants, is due to excess gasoline production which has broken the market, rather than to the Connally contraband oil act, it is charged by Secretary of the Interior Harold L. Ickes.

The secretary's views were made known in a letter to Senator Tom Connally of Texas, author of the contraband oil act, commenting upon a letter to the senator from P. H. Hertzog of Premier Oil Refining Company, Longview, Texas, expressing concern over the situation.

"Wholesale prices for petroleum products, particularly for gasoline, have declined during recent months while the field posted prices for crude oil in most instances, have not been reduced," Ickes pointed out.

"As a consequence, non-integrated petroleum refineries in East Texas and elsewhere in Texas, Oklahoma, Kansas and other states east of California, have found it difficult, if not impossible, to continue in operation. I have been informed that the East Texas refineries which ship in interstate commerce recorded during November, 1937, an average loss of 15 cents per barrel of crude oil refined and, since that time, there has been no indication of improvement in conditions. Elsewhere, as in Oklahoma and Kansas, the department has been advised informally of losses to the extent, in some instances, of nearly 30 cents per barrel.

"The decline in wholesale gasoline prices has been credited generally to the fact that gasoline production has been materially in excess of current demand, with the result that gasoline inventories have reached an all-time peak, with additional increases anticipated during the next few weeks. This is a situation, in my opinon, for which the enactment and administration of

the Connally Law has not been responsible and for the correction of which no authority is vested in the Federal government."

Pointing out the limitations of the Connally Act, which gives the government no control over the production of gasoline, the secretary referred to the fact that while the act is being applied only in the five counties comprising the East Texas field, that field at the time of its discovery comprised one-fourth of the oil reserves of the entire nation, that its current production is about 15 percent of the national output and that 61 percent of the flowing wells in Texas are located in the one field.

Ickes challenged statements that the act and the Texas regulations have driven a large number of refineries out of operation in the East Texas field and that there were 60 plants operating there in 1035. At no time during that year were there as many as 60 refineries in the field, he declared, and even during the chaotic period between invalidation of the NRA and enactment of the Connally Act there were less than 30 plants operating. There are now 12 refineries in the field.

"The history of petroleum refining in the East Texas field," he explained, "has been one of gradual transition from a period in which there were numerous inefficient refineries of small capacity to the present period in which there are a smaller number of refineries with equipment of modern design and increased individual capacity. This smaller number of refineries has produced in the aggregate a quantity of gasoline equal to that produced earlier by the larger number of less efficient plants.

"I would be glad if there were some way in which I could be of service in so correcting conditions as to make profitable the operations of the non-integrated refineries and the continued employment which would result therefrom but, you are aware, I am certain, of the fact that my authority in this respect ended with the termination on May 27, 1935, of the Code of Fair Competition for the Petroleum Industry."

Asks Buying Resumption

Oil men visiting the Department of the Interior are understood to have asked the assistance of Secretary Ickes in working out some arrangement whereby the integrated companies may resume purchases from independent refiners.

The problem is one which is receiving attention generally throughout the industry, it was said this week by Russell B. Brown, general counsel of the Independent Petroleum Association of America, and might be satisfactorily solved, he pointed out, by the enactment of legislation such as was contemplated in Section 6 of the Cole Bill several years ago.

Section 6 of that measure authorized voluntary industrial agreements to control production so as to avoid waste to develop fields or pools in an orderly systematic and scientific manner and to operate refineries in such manner that non-integrated plants may operate on a fair basis with the integrated companies so that equitable access to sources of crude be assured and independents guaranteed fair access to markets. Such agreements would be subject to approval by the president.

Legislation authorizing the making of such agreements might serve to offset some of the difficulties which have arisen from the Madison decision, Brown said, but explained that he did not believe it should be offered unless and until the industry generally was solidly behind it.

In view of the troubles of the independent refiners and the desire of the administration to aid the smaller industries, he pointed out there is no reason why the government should object to such a plan surrounded by safeguards adequate to protect against anti-trust proceedings.

A number of members of Congress from the oil states are known to have been approached with requests for assistance but none has yet indicated any intention of seeking legislation at this time.

Threat of East Texas Crude Price Reduction Grows Ominous

SUFFICIENT tanker-loads of East Texas crude oil have been sold on the Texas coast at below-market prices to justify recent fears of an impending reduction of the established posting in that big field.

Some dealers have lowered the f.o.b. ship price 10 cents a barrel, and in some cases more, below the prevailing market value, consisting of the $1.35 a barrel posting for oil at the wells, and the transportation costs of 5 cents for gathering line service, 12½ cents for trunk pipe line movement to the coast, and 2½ cents for boat-loading.

Market Curtailed

The East Texas crude market has been relatively weak for some weeks, because of the continued heavy production in the area, under a comparatively high field allowable, and because of recent contraction of demand for the crude, resulting from the languishing gasoline market. Thus crudes of good quality in more favorably located fields have been cutting into the East Texas market, while shut-downs or slowing-downs of East Texas independent refineries also have circumscribed the market for the East Texas crude.

Furthermore, the East Texas crude posting has been relatively high, in comparison with other Mid-Continent prices, since the field was given a special 8-cent raise, from $1.27 to $1.35, last May.

There have been some expectations lately that the price might be cut back in the near future at least to the former $1.27 level.

Other Markets Steady

It is believed that the remainder of the Mid-Continent crude market is not in any immediate danger of declining, in view of the prevailing strict control of production.

But a continuation of under-market selling of East Texas crude possibly might tend to unsettle the general market, and for that reason the situation in the big field is of major significance.

In most quarters it is expected that any reduction in the present East Texas crude posting is more likely to be through action of independent buyers and refiners than through a revision initiated by a major company. For the federal government recently began investigating the possibility that large companies might have been artificially supporting the East Texas crude price in the face of lower gasoline prices, to the detriment of independent refiners. In view of this investigation, the large buyers obviously would prefer to follow the lead of an independent in posting a lower crude price, instead of taking the initiative.

Special oil session in California planned

Governor Merriam of California last week notified members of the legislature to be ready for a special session March 7, to consider oil legislation primarily, but also other matters.

It was stated unofficially that California's participation in the Interstate Oil Compact would not be considered.

It was understood that a bill would be introduced calling for a 3-man state board to regulate tideland drilling at Huntington Beach, with members including the state director of natural resources, the state controller, and the state director of finance.

It was believed that no action would be taken on proposals to give the California railroad commission or some other state body jurisdiction over oil and gas production on privately owned lands.

Illinois oil tax is indicated

Indications that a production tax on crude oil may be levied in Ilinois were evident last week when the State Budgetary Commission, created by the last general assembly to study the state's financial problems, named a sub-committee to seek new sources of revenue. Other revenue measures under consideration by the commission are a tax on cigarettes and a levy on unclaimed bank balances. No indication was given as to when the commission would issue a formal report.

Texas investigators walk out of meeting

The Texas legislative committee investigating activities of Land Commissioner William H. McDonald and Attorney General William McCraw ad-

journed last week when two of the four members present walked out.

Senators Joe Hill and Tom Holbrook left the meeting when they were unable to get a vote which would result in a subpoena of the attorney general's bank account.

Just when the committee might meet again or what matters might be discussed is uncertain. During the course of the session in Austin last week various leases were discussed and Land Commissioner McDonald was required to explain his bank account and deposits he had made since a few months prior to the time he had become commissioner.

Attorney General McCraw took advantage of this occasion to announce officially his candidacy for the governorship.

Question Pennsylvania investigation constitutionality

Pennsylvania's oil industry investigating commission, crippled January 20 by a preliminary injunction obtained by Petrol Corporation, of Philadelphia, which contended that a subpoena issued by the commission would require the company to produce confidential records, was further handicapped last week when the Dauphin County Court at Harrisburg issued a preliminary injunction restraining the commission from contracting further debts until the constitutionality of its investigation has been determined. The new order was granted on the petition of George W. Scudder, a taxpayer, and directs Auditor-General Warren R. Roberts and State Treasurer F. Clair Ross to refuse to approve or pay money for commission expenses.

Meanwhile, the legal dispute involving the Petrol Corporation's action was given a preferred position on the Dauphin County Court's list of cases awaiting decision. Judge Ralph H. Smith, Pittsburgh, chairman of the commission, said the delay had cost that body $7500 and that the commission's counsel had been "directed to make every effort to expediate a decision."

The commission was created by the 1937 legislature to determine whether any branch of the oil industry should be regulated as public utilities. An appropriation of $50,000 was made available for expenses of the commission, and authority to hire experts and subpoena witnesses was granted. Numerous hearings on the production and pipeline divisions of the industry have already been held, and questionnaires were recently issued in an effort to determine operating costs and other data. A number of the questionnaires have been filled out and returned to the commission, while others are being held pending a decision on litigation challenging constitutionality of the probe.

Bids asked on North Louisiana federal lands

Bids for the purchase of oil and gas leases on three parcels of public land in the Carterville-Sarepta and Rodessa oil and gas fields in northwest Louisiana, will be opened at Shreveport April 11, it was announced March 3,

[*Continued on page 68*]

Proration Picture

Oklahoma curtails allowable 25,000 barrels, and may cut more . . . Kansas reduces 6872 barrels daily . . . Buckeye curtailment up to producers.

OKLAHOMA last week assisted in the potentials. Minimum allowable was reduction of production allowables by issuing a temporary order cutting 25,000 barrels daily from its output, and continues to consider the possibility of curtailing an additional 25,000 barrels. Kansas likewise reduced its output, lowering its allowable 6872 barrels. Meanwhile, another important proration development was the uphold of Oklahoma's spacing law by the state Supreme Court.

Oklahoma Action

Following a week of dickering over further reduction of the March crude oil allowable for Oklahoma, the corporation commission February 28 issued a temporary order for 475,000 barrels daily, and stated the case would be held open until March 7 for further study of evidence.

Facts had been presented showing the market demand for the state would not exceed 450,000 barrels daily for the month, but strong opposition, coming from the Southern Oklahoma Oil & Gas Association, caused the commission to hesitate before establishing the low figure without further consideration.

Hardest hit of the Oklahoma areas would be Carter and Stephens counties, where producers were notified by officials of Carter Oil Company that the company would be forced to reduce its purchases nearly 50 percent unless it got some relief. Carter has been purchasing about 18,000 barrels of low gravity crude daily from the areas, but lately has lost a market for 9000 barrels. The concern stated it is storing a considerable portion of the crude being taken there at present.

The protest was presented to the commission following a meeting at Ardmore February 26, where speakers said such a drastic reduction would cut profits to the point where approximately 700 wells would be forced to shut down.

W. J. Armstrong, chief conservation officer of the corporation commission is urging producers to make a voluntary cut-back in order to assist in stabilizing the market. "If this cannot be done then the sad news which overproduction always develops may threaten," he said.

Apparently there is no hope that the Oklahoma market situation will improve immediately. Major reduction for southern Oklahoma is due to the lack of demand for fuel oil, made from the low gravity crude produced there. Armstrong said the market was not going to other states, for the simple reason they are having their own troubles with allowables.

The temporary order cuts production in the Oklahoma City Wilcox zone to 85,699 barrels daily, 8.5 percent of the fixed at 225 barrels per well per day. Allowables of 90 percent were granted pools in the St. Louis district of Pottawatomie County and Oklahoma City-Cleveland and Olympic pools. Percentage allowables were granted other pools in the state, ranging from as low as 2.5 percent for the Crescent pool, Logan County, to 13.8 percent for the Sasakwa-Wilcox pool of Seminole County. Unprorated areas were given an allowable of 151,504 barrels daily, a reduction of 15,000 barrels.

Despite the fact that Sinclair Prairie Oil Marketing Company announced it would reduce its purchases 10 percent below the February takings, and other major purchasing companies stated they were in no position to offer Carter Oil Company any relief; two refineries in the general area stated they might be able to take some of the excess crude from southern Oklahoma.

Rock Island Refining Company, at Duncan, Oklahoma, made a bid for 5000 barrels of the southern crude. The announcement was made through Dr. H. B. Alspaugh, who said a reduction in the allowable would enable the company to take crude from some wells to make up its balance. Champlin Refining Company, at Enid, Oklahoma, offered purchasers 150,000 barrels of empty tankage for storage of crude for 60 to 90 days.

Kansas fixes figure above March demand

March crude allowable for Kansas was fixed at 169,528 barrels daily following a meeting of the corporation commission at Wichita, February 26. The figure is 3766 barrels higher than nominations made by purchasing companies at a meeting earlier in the week. Nominations totaled 165,762 barrels, adjusted to include eight companies not represented at the time, but which have purchased during previous months.

The allowable is 6872 barrels below the February figure and 7172 barrels below the estimated market demand of 176,700 barrels submitted by the Bureau of Mines.

Oklahoma spacing law is upheld

Right of the Oklahoma Corporation Commission to limit spacing of oil wells to prevent wasteful production was upheld March 1 following a unanimous decision handed down by the state supreme court. The ruling was in the case of Russell B. Patterson, Tulsa, versus Stanolind Oil & Gas Company and Amerada Petroleum Corporation. A previous ruling by the dis-

trict court of Tulsa County was against Patterson.

The companies were sued for $989.68, which Patterson claimed was the amount due him from interest in a well in the North Wellston pool of Lincoln County. Stanolind and Amerada offered settlement of $824.32, contending his loss was the difference due to well-spacing provisions. The supreme court increased the amount to $872 but upheld regulatory right of the commission. The ruling favored the well-spacing, in that it "seems to be a much more feasible and effective method of securing a just distribution than restriction on production."

Texas gas order

The Texas Railroad Commission has issued an order, effective on March 1, permitting the production of 175,000,000 cubic feet of gas daily in the East Panhandle field. A similar order will permit production of 17,487,000 cubic feet of gas daily for wells in the Rodessa field. These are the only Texas gas fields now operating under proration orders.

Michigan troubles

Proration in the still flush Buckeye, Gladwin County field (potential estimated at 80,000 barrels daily against current market of 32,000 barrels for the field) this week was up to operators and pipe line companies, following dissolution of the Buckeye Producers Committee, which was organized in the spring of 1937, to handle proration of the field. Inability to obtain full or adequate cooperation, and collapse of a 20-barrel prorate order last month, was blamed for breaking up of the committee.

Michigan gas rules meeting is called

The Michigan Public Utilities Commission has issued invitations to about 300 natural gas producers, transmitters and distributors to attend a meeting at Lansing March 14 and 15 to consider changes in rules for production, transmission and distribution of natural gas within the state. The present rules, drafted in 1934, have been subject of severe criticism by independent operators who maintain that present proration of natural gas withdrawals is beneficial to large operators but adverse to interests of smaller operators.

The commission is giving formal consideration to a general revision of rules and regulations "because of changed conditions, added experience, new discoveries and new information," explained C. A. Winder, chief engineer for the commission. "In order to expedite consideration of changes, the commission has prepared a tentative draft of additions and amendments to the rules," he added. "These contemplate equalizing the take betwen wells so that the small well will be permitted to sell more gas than it does now. This may mean a lessening of the take from some of the larger wells. The suggested changes look for a reduction also in the vast amount of waste now reported. Meters would be placed at every well, of which 434 now are in operation.

Labor Situation

Oil companies lose appeal to Mexican court . . . Oil Union asks recognition from Shell . . . Pennsylvania workers collective bargaining right upheld in court.

THE most important development in the industry's labor situation during the past week was the unanimous decision of the Mexican Supreme Court to reject the appeal of 17 American and British oil companies against an arbitration board's award which would increase wages about $12,000,000 a year. The case was regarded as the most important to reach the Supreme Court since the famous "Texas cases" in 1928, which served as the basis for the so-called "Calles-Morrow agreement" between President Plutarco Elias Calles and American Ambassador Dwight Morrow. Another incident of importance is the attempt of the Oil Workers Union to force the Shell Petroleum Corporation, Houston, to recognize the union as bargaining agency.

Mexican Workers Win

The Mexican Supreme Court's recent rejection of the oil companies appeal from the Federal Labor Conciliation Board's award in the general conflict, which, although not unexpected, has prompted widespread speculation as to what the companies will do. Some believe that firms will quit Mexico, but others, including some members of the industry, assert they will "take it" for the sake of their huge investment and seek to retrieve the annual increased overhead. The involved companies issued a statement which stated in part: "The companies have made it abundantly clear during the past months to their employes and the general public that the conditions recommended by the commission of exports, which served as a basis for the decision handed down by the Federal Labor Board, are of such a nature that it would be impossible to comply with them, and their inability to comply with them remains unaltered by the court's verdict. Accordingly they regret deeply the denial by the court of their appeal, which cannot but have serious consequences for the companies, their employes and those dependent on the industry."

Although pessimism is general in oil circles and some talk is heard of expropriate properties of the companies involved in the general conflict, well informed sources do not believe that the Government administration, though it is inclined toward industrial nationalization, would undertake such a step.

These sources intimate that the oil companies will remain in Mexico, but that they will drastically curtail their activities and cut personnels to the minimum. It is pointed out that the status of the oil companies differs radically from that of branches of foreign enterprises, because they are constituted as Mexican companies and are completely under Mexican law.

Oil spokesmen say that the companies do not fear a reported thorough Government examination of their books, as their accounts have been open to the government since last June and they have nothing to hide.

A final decision on the course to be pursued by the foreign companies is expected to be taken in New York. Executives of the largest American companies flew there early last week when it was learned the Supreme Court decision was imminent.

Union Files Charges

An attempt to force Shell Petroleum Corporation, Houston, to recognize the Oil Workers Union as bargaining agent for employes at the Deepwater plant has been made before the National Labor Relations Board last week.

J. E. Crossland, secretary of the union claims that company officials had refused to recognize the union's right for the sub-foremen and "gang pushers" class of employes, claiming they were part of the management and excluded from the Labor Relations Act provisions. The union members went on strike last year but returned to the refinery after the company had signed an agreement, stating the union was recognized as the bargaining agent for all employes, with the exception of office employes and those who may be excluded by the Labor Relations Act.

Negotiations started January 5 and have continued without any success, it is claimed by the union secretary. The only thing we could do was to file charges before the labor board to thresh out the matter, Crossland explained. This has been done and the hearing was set for Friday of last week.

Pennsylvania Ruling

The right of Pennsylvania workers to organize and bargain collectively as provided in the "Little Wagner Labor Act" passed by the 1937 legislature was upheld last week by the Dauphin County Court at Harrisburg. At the same time, however, the court severely rebuked the state labor relations board for "prejudiced" conduct at a hearing. The board was set up by the act with authority to order reinstatement of employes it found had been discharged for union activity.

Judge John E. Fox, who wrote the decision, set aside an order of the board directing reinstatement of three employes of a Harrisburg firm, holding that the board failed to conduct an "impartial" hearing on the complaint of the discharged employes. The court said that the wish of two members of the board "to have the plant unionized was the father of much of their examination," pointing out that the act emphasizes that hearings "must be conducted in a fair and impartial manner."

Earnings Under High Levels of 1937

Oil companies are likely to show somewhat smaller profits in first quarter of 1938 than in similar period of 1937, because of lower gasoline prices.

By L. J. LOGAN
Associate Editor

AFTER having gained in 1937 about 25 percent more profit than in 1936 and almost as much as in the all-time record year 1929, oil companies have suffered this year some decline in aggregate earning power. And they likely will show for the first quarter of 1938 appreciably less profit than in the corresponding period last year.

Gasoline Market Impaired

This inability to equal the high level of 1937 earnings is based primarily on the fact gasoline prices, from refinery to service station, have not been as favorable this year as last year. The gasoline market began losing ground in September, last year, and prices thereafter declined persistently until after the end of the year.

Some weeks after the new year dawned, the decline of gasoline prices finally was halted, and subsequently the markets have been fairly stable at the new, lower price levels. But these current prices are considerably under those of a year ago. Prices at the refineries are down about 10 percent, on the average, for the country as a whole; and tank wagon prices to dealers are off almost as much.

The lower gasoline prices are being compensated only in small part, meanwhile, by increased volumes of business. For gasoline consumption lately has been running only slightly higher than the 1937 levels.

Other Markets Resistant

With exception of the gasoline quotations, however, prices in the oil industry have stubbornly resisted all the various depressing influences, and have been, in general, as good this year as last year, if not better. This has been true of various refined products, such as fuel oil, as well as of crude oil.

Fuel oil prices advanced materially last summer and fall, and subsequently have largely retained the gains; although continued building up of storage finally has caused some sagging of the established prices.

Crude oil prices generally have been a little higher in the opening portion of 1938 than in the similar period last year. For postings were advanced about 10 percent at the end of January, 1937, and so far have been retaining that improvement.

There are, however, some exceptions. In Pennsylvania and Michigan, for example, crude prices declined in the latter part of 1937, and are still at the lower levels. In California, prices are the same as at this time last year, as that state did not share in the early 1937 advances.

In consequence of the comparatively good crude prices, and also through benefit of slightly larger petroleum demand and production, the producing division of the industry has been faring relatively better than the refining and marketing divisions.

Refiners Affected Adversely

In view of the above facts regarding prices of refined and crude oils, it is indicated that profits for the first quarter of 1938 will be materially smaller than in the similar period of 1937 for companies specializing in refining and marketing and for integrated companies with substantial interests in the refining and marketing divisions.

Among the companies in these classifications, the least favorable showings probably will be made by those heavily interested in the Mid-Continent. For that area has been hit harder than the country as a whole in the gasoline market decline. Prices have declined some in the Eastern States, but not as much as in the Mid-Continent. And in California there has been no material decline. Furthermore, the larger companies on both the East and West Coasts with substantial foreign business will be less affected by the domestic gasoline market than some of the Mid-Continent concerns.

Producers Have Advantage

Companies specializing in producing crude oil and integrated companies well fortified with producing properties may be expected to show for the first three months of 1938 profits comparing favorably with those in the similar period of 1937. Some of those companies, indeed, may have better first quarter records this year than last year, because of slightly better prices and slightly larger volumes of production.

Year's Prospects Good

Beyond the end of the first quarter, the future of the oil industry is quite obscure, and the trend of earnings is conjectural.

But the uncertainty is based largely on the general business situation, as the oil industry so far has managed to retain a comparatively sound internal condition, except for permitting gasoline stocks to become so large as to impair the gasoline market.

And if the general trends prove reasonably favorable, the oil industry may be expected to have a relatively profitable year in 1938.

Business More Stable

From the standpoint of the general business picture, some encouragement has been offered lately. For conditions have become appreciably more stable in recent weeks.

In contrast with the sharp declines in the latter part of 1937, the general business trends so far this year have been sidewise. Volumes of industrial production, for instance, contracted greatly in the four closing months of last year, but they have remained largely unchanged from December to now.

Similar level trends have been taken by stock market prices and the prices of commodities.

These trends indicate that the busi-

ness recession has been halted, and that many lines of business have become comparatively stable at the present lower levels; although there have not been any strong indications of the beginning of a new recovery movement.

World Situation

The ultimate welfare of the oil industry is tied to the general business conditions of not only the United States but also of the world.

So far, most of the world outside the United States has escaped the business decline which this country has suffered.

But there have been some indications that other countries ultimately will also experience declines.

England, in particular, has been showing some adverse signs. In that country, unemployment has been progressively increasing for several months. Canada also has experienced some decline in production and employment.

Meanwhile, prices of securities have been moving downward in recent months in most countries of the world.

The less favorable trends outside the United States obviously hold ominous implications. For it is possible that the foreign developments ultimately may result in further recession in the United States.

However, the slowing down of other countries may have resulted from the decline in United States consumption of foreign goods.

If the United States actually has had a dominant influence on the world conditions, it logically might follow that the country will continue to determine the world trend; and in such event, the world outlook must remain conjectural pending more conclusive trends in the United States.

Oil Situation Satisfactory

While the earning possibilities of the oil companies depend in large measure on the national and international business situations, they also must be affected even more directly by the conditions within the industry itself.

So far, the industry has maintained a relatively strong position, although it gave up some valuable ground in permitting the gasoline stocks to become burdensome.

And encouragement is given by the effective measures that have been taken lately to protect the position now held. These measures have included tightening up of crude oil production control and curtailment of refinery operations.

Both crude production and refinery runs have been brought into close conformity with market requirements, and the effects on crude and refined oil stocks have been favorable.

Exceptionally strict control of operations is scheduled to continue through March, and probably will be extended even further.

Earnings Good in 1937

Apparently, the oil industry as a whole earned about 25 percent more in 1937 than in 1936, thereby almost equaling the profits of 1929, the best year on record.

As indicated in the accompanying table, 13 oil companies, representing a good cross-section of the industry, earned 24 percent more in 1937 than in 1936.

For 11 of the companies, annual earnings are shown all the way back through 1926. Those 11 companies in 1937 earned 25 percent more than in 1936, and almost equaled the record level of earnings attained in 1929. The 1937 profits of the 11 companies were larger than those of 1926 and 1928, two other unusually good years.

Companies in the tabulation showed widely different comparisons for 1937 with 1936, although all but 2 of the 13 registered improvement.

Houston Oil Company of Texas showed the largest percentage of gain, having earned 215 percent more in 1937 than in 1936, but was followed closely by Standard Oil Company of Kansas, which showed a 204 percent increase.

Other noteworthy increases were those of 132 percent for Navarro Oil Company, 97 percent for Union Oil Company of California, and 80 percent for Bishop Oil Corporation. Panhandle Producing & Refining Company did 62 percent better, Lion Oil Refining Company 59 percent better, and Atlantic Refining Company 35 percent better. Standard Oil Company (New Jersey) earned about 27 percent more in 1937 than in 1936, Sun Oil Company 26 percent more, and Quaker State Oil Refining Company slightly more.

Shell Union Oil Corporation is estimated to have earned about 18 percent less in 1937 than in 1936, and Texas Gulf Producing Company reported 27 percent less, but non-recurring items were partially responsible for the declines in profits of both those companies.

Oil Companies Earn About 25 Percent More in 1937 Than in 1936 and Nearly as Much as in 1929

Table Shows Net Profits, After All Deductions, Including Interest, Depreciation, Depletion, Amortization, Federal Taxes, Minority Interest, etc.

YEAR	Atlantic Refining Company	Bishop Oil Corporation	Houston Oil Company & Houston Pipe Line Company	Lion Oil Refining Company	Navarro Oil Company	Panhandle Producing and Refining Company	Shell Union Oil Corporation and Subsidiaries	Standard Oil Company of Kansas	Standard Oil Company (New Jersey)	Sun Oil Company	Union Oil Company of California	Total, 11 Companies	Quaker State Oil Refining Company	Texas Gulf Producing Company	Total, 13 Companies
1926	$7,021,334	$ 3,545	$2,226,801	$1,181,278	$ 63,927	$325,151	$31,518,965	$163,203	$117,652,201	$3,358,900	$11,831,618	$175,346,926	.....	.....	.....
1927	2,315,715	*81,097	2,429,331	450,975	*260,346	* 22,287	11,344,914	*827,757	40,422,857	2,791,057	10,048,493	68,611,855	.....	.....	.....
1928	16,848,807	3,933	1,812,517	206,411	*272,461	84,280	20,595,021	292,228	108,485,686	5,008,027	11,101,935	163,966,384	.....	.....	.....
1929	17,332,417	510,385	1,731,469	1,184,478	* 12,767	151,619	17,573,249	1,512,912	120,912,794	8,242,492	15,019,636	184,158,684	.....	.....	.....
1930	2,742,688	49,304	1,655,336	*647,108	* 53,497	*449,401	* 5,095,574	380,148	42,150,663	7,745,484	9,604,997	58,083,040	.....	.....	.....
1931	513,750	*128,161	*356,484	*728,879	35,423	*515,644	*27,008,310	*618,616	8,704,758	3,107,147	3,054,913	* 13,940,103	.....	.....	.....
1932	3,918,021	8,092	*901,648	*385,098	31,921	*353,948	660,076	69,971	282,865	4,198,046	3,211,084	10,739,382	.....	.....	.....
1933	6,556,377	75,071	*487,178	*221,543	167,950	*234,663	* 4,240,965	77,790	25,084,310	6,971,844	1,954,279	35,703,272	$1,045,236	$459,058	$37,507,566
1934	5,512,105	149,857	281,146	12,652	216,778	*194,878	* 949,111	366,780	45,618,960	6,650,464	2,902,733	60,567,486	630,506	800,973	61,998,965
1935	3,970,598	141,962	837,639	* 53,455	270,798	* 26,009	6,912,835	131,748	62,863,192	7,100,238	5,038,286	87,087,832	914,567	798,181	88,800,580
1936	7,342,197	178,019	500,441	594,735	291,090	154,405	‡22,494,364	257,081	97,774,583	7,563,554	6,133,398	143,283,867	1,041,034	823,410	145,148,311
1937	9,935,045	320,481	1,574,327	945,334	†674,933	§250,000	§18,500,000	781,783	§124,500,000	9,544,085	12,061,332	179,087,320	1,041,848	‡604,585	180,733,753
Total	$4,009,054	1,231,391	11,303,697	2,539,780	1,153,749	*831,372	92,005,464	2,587,271	794,452,869	72,281,338	91,962,704	1,152,695,945	4,673,191	3,486,207	514,189,175
Change 1937 from 1936	+35%	+80%	+215%	+59%	+132%	+62%	−18%	+204%	+27%	+26%	+97%	+25%	.....	−27%	+24%

* Loss. † Before federal income taxes. § Estimated. ‡ Includes non-recurring profit of $2,829,504 from sales of an investment. ‡ Embodies non-recurring deductions, including approximately $100,000 on losses of leaseholds abandoned and $238,000 set aside as a provision for contingencies.

IMPROVEMENTS RECOMMENDED FOR THE INSTALLATION OF

Oil Field Tanks

By OTTO D. STALLARD, JR.
Superintendent of Gaugers
Magnolia Pipe Line Company

PURCHASING companies are trying in every way to assist oil producers in keeping their field tanks clean, and with some attention given to the placing of flanges and the hanging of hatches much can be done to materially accomplish this end. Consequently, the accompanying article, in which one purchaser of crude calls the attention of tank builders to a number of practices that not only would be beneficial to the owner of the lease, but to the purchaser of the crude as well.

Heretofore, little thought has been given to the placing of hatches, flow lines, test lines and treater lines. If the producer expects to keep the tops of his tanks clean, he should give this matter more than a passing thought. In the majority of instances there is no reason for a gauger spilling oil around a gauge hatch, the trouble usually being that the hatch was placed in the wrong position when being built in the field, or that the producer has placed his connection in such a way that a gauger has to be a contortionist to make the inspection.

The article is not a criticism of any manufacturer's products, but is for the purpose of calling the field builder of tanks attention to improvements that would eliminate a lot of disadvantages and unnecessary work in the field.

PRACTICALLY all the new batteries of tanks purchased, as well as the old batteries that are reset or re-conditioned have metal stairways and side walkways installed. With this improvement some thought should be given to the standardization of the tanks themselves and the fittings thereon.

We should start with the laying of the tank bottom, drain flange, manhole, steam coils, outlet connection, sample cock, test line, flow line, gas line, vent system and the gauge hatches.

There is no doubt a reason for all things, but in most instances the reason for failure to make a method of standardization a success is the inability to understand thoroughly the requirements of all concerned who use the equipment.

It takes the average pumper about two minutes to gauge and switch oil from one tank to another with top of the tank control; whereas it takes the pipe line gauger from seven to 10 minutes to gauge and make the necessary inspection on each tank of oil run.

All gaugers are instructed to

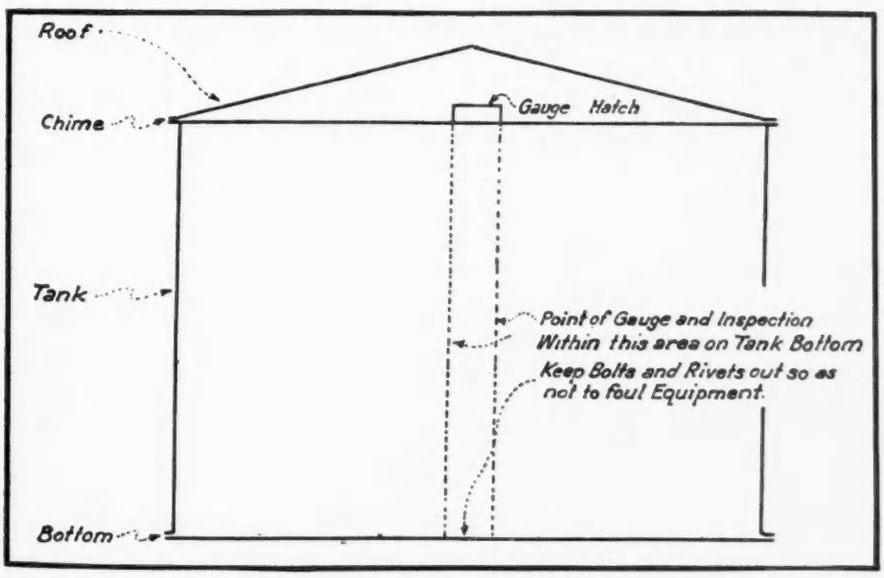


FIGURE 1
Tank Bottoms.

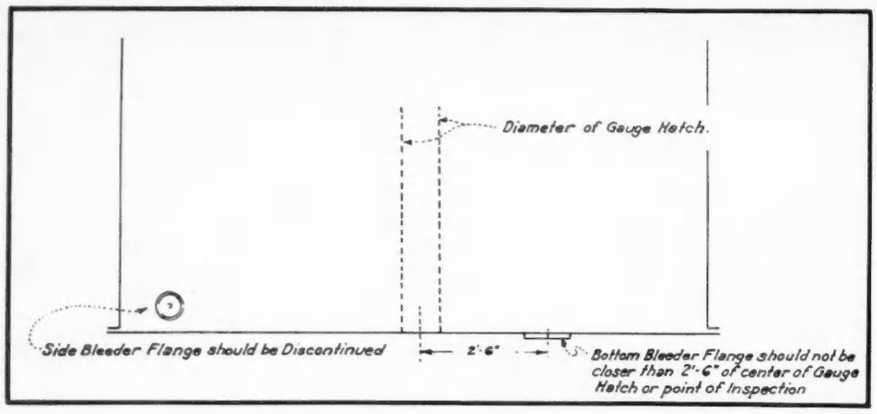

Diameter of Gauge Hatch.
Side Bleeder Flange should be Discontinued
2'-6"
Bottom Bleeder Flange should not be closer than 2'-6" of center of Gauge Hatch or point of Inspection

FIGURE 2
Bottom Bleeder.

keep the tank tops as clean as possible and this can be done only if the equipment for making the inspection can be handled properly with free access to the gauge hatch.

Tank Bottoms

The bottoms of bolted tanks or riveted tanks should be laid so that the bolts or rivets do not interfere with the gauging or thiefing operation by being placed directly below the front or back gauge hatch, as shown in Figure 1.

Tank bottoms should be laid level on as solid ground as possible.

Bottom Bleeders

The bottom bleeder flange or weld should be centered not less than 2½ feet from the center of the gauge hatch opening of the front or back hatch. It should always be placed to the right of the hatch so as not to interfere with the flow line, test line or gas line connections, as shown in Figure 2.

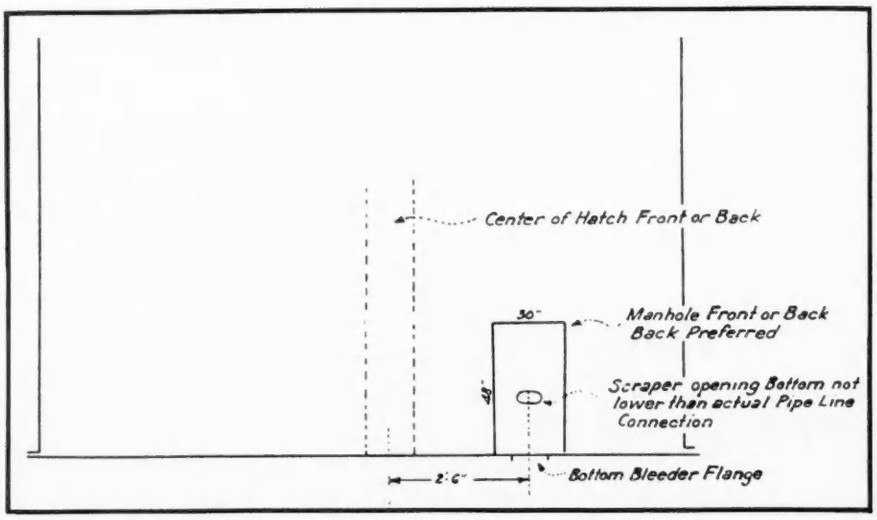

Center of Hatch Front or Back
30"
Manhole Front or Back Back Preferred
48"
Scraper opening Bottom not lower than actual Pipe Line Connection
2'-6"
Bottom Bleeder Flange

FIGURE 3
Manhole or Cleanout Plate.

Lock stops are placed on the bleeder line by the producer as a protection to the producer and the purchaser, by being sealed off while the tank is on the line. The connections should be kept as near ground level as possible so that the stops may be observed and properly sealed or locked off. Suitable valves should be provided to meet drainage requirements.

Side Bleeder Flange

Side bleeders as placed near the bottom on the shell of the tank or tanks should be discontinued as it is almost impossible for the producer to keep his tank bottoms down without considerable loss of good oil. (See Figure 2.)

Bleeder systems should be placed on the back side of the tanks in the interest of safety, centralizing the cleanout trough lines, etc., at this point.

Manhole or Clean-Out Plate

The manhole or clean-out plate should be of sufficient size to ad-

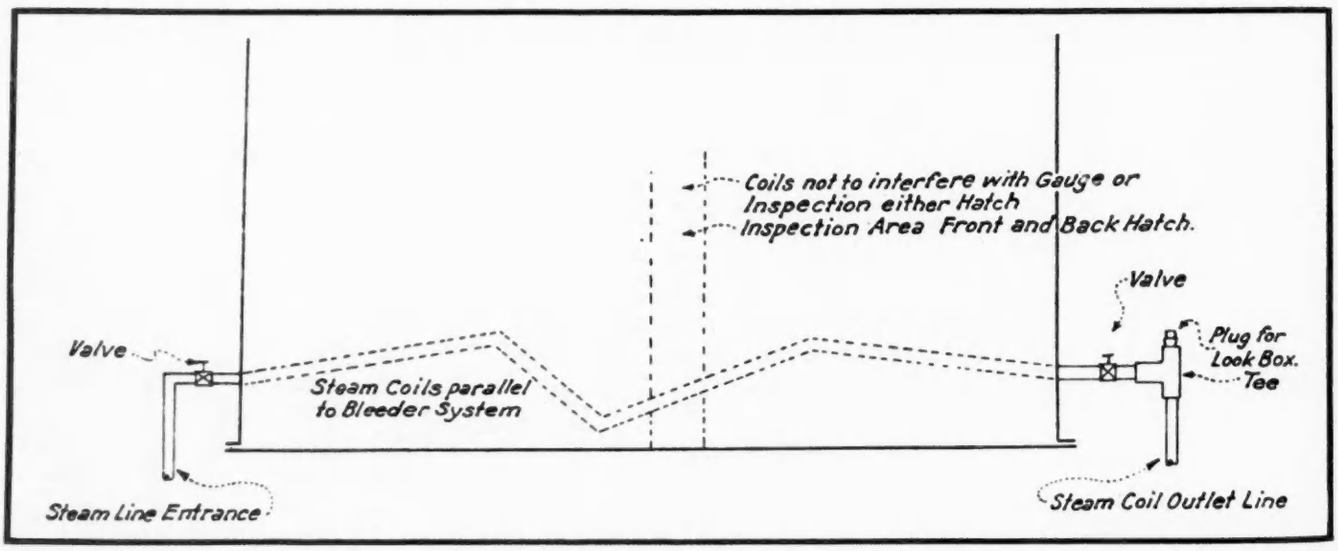
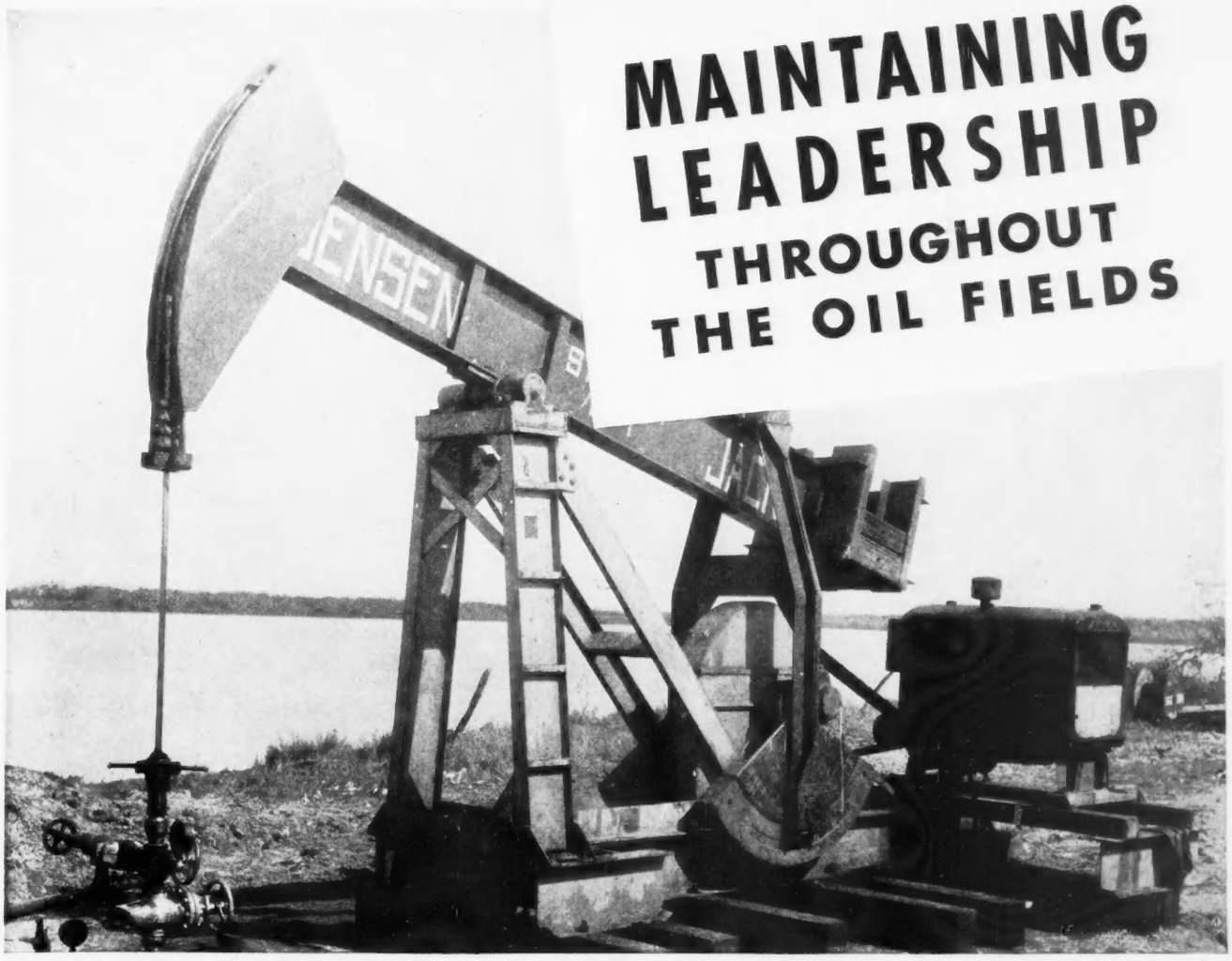

Coils not to interfere with Gauge or Inspection either Hatch
Inspection Area Front and Back Hatch.
Valve
Plug for Look Box.
Tee
Valve
Steam Coils parallel to Bleeder System
Steam Line Entrance
Steam Coil Outlet Line

FIGURE 4
Steam Coils.

MAINTAINING LEADERSHIP THROUGHOUT THE OIL FIELDS



Jensen "Straight Lift" Jack manufactured by Jensen Bros. Manufacturing Co. Pump operating in Texas, Tula Lake District and equipped with TIMKEN Bearings on main shaft and pinion shaft.

Tapered Roller
TIMKEN BEARING
EQUIPPED

A symbol of quality for any piece of equipment with which it is associated

TIMKEN Bearings have a strong influence on low costs in every oil field operation—from the drilling of the well to the arrival of the oil at the refinery. There is hardly a single type of equipment used in the oil fields that is not feeling the full force of TIMKEN Bearing economies in operation and maintenance.

Since economy cannot be divorced from dependability you must also have *dependable* bearings for economical performance. Here again TIMKEN Bearings play their important part. By reason of this dependability they have constantly maintained leadership throughout the oil fields. It pays to use Timken Bearing Equipped oil field machinery of all kinds.

The Rock Island "Rockets" Roll On TIMKEN Bearings

GLIDE—as you ride a Timken-equipped train

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN

TAPERED ROLLER BEARINGS

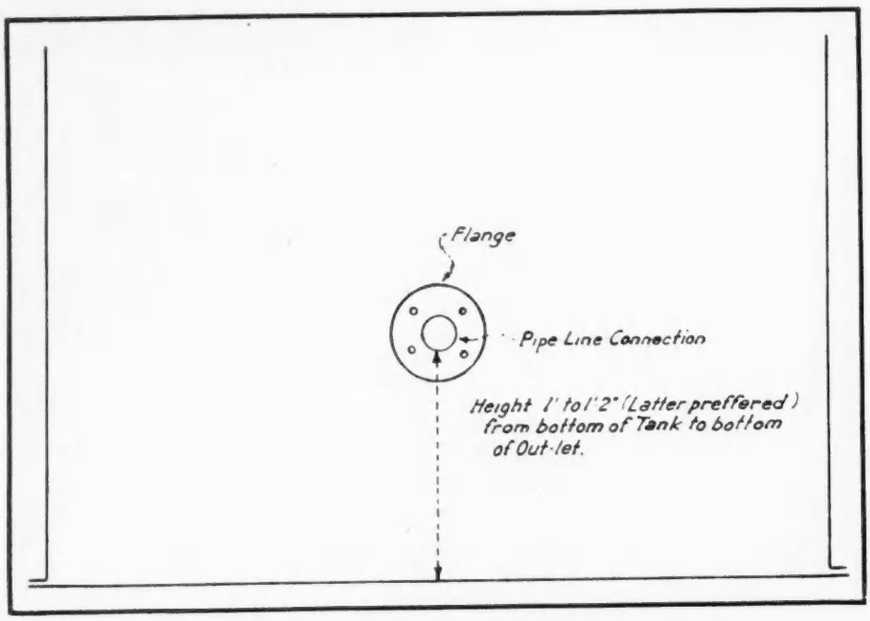


FIGURE 5
Outlet Flange.

purchaser can check the condition of the coils.

Coils in bad order should be replaced immediately for they provide a chance of loss of oil either to the producer or the pipe line company.

The coils should be placed parallel with the bleeder system and in such a position as not to interfere with the inspection or gauging of oil from either the front or back hatch. (See Figure 4.)

Pipe Line Connection Flange

The majority of tanks of 150-barrel capacity or less have three-inch flanges or welds, and tanks in excess of 150-barrel capacity

mit a man for clean-out or repair purposes, it should be so constructed that it may be taken off or put on by the lease man without the assistance of a tank builder. (See Figure 3.)

The manhole or clean-out plate should be placed directly above the bleeder connection. If equipped with a flange or hand hole plate slightly above the outlet connection the bottom may be cleaned numerous times without the necessity of a man entering the tank. A scraper operated through such opening allows the bottom to be pulled to the drain on the bottom connection, satisfactorily cleaning the tank bottom.

Steam Coils

Steam coils for heating or treating oil are as a general rule placed four inches off the tank bottom, entering the tanks at one point and coming out near the bottom drain connection. The outlet steam connection with small valve control should be directly connected into the b.s. & w. trough or through a steam outlet line so as to eliminate all escaping steam and water in the immediate vicinity of the tanks. A tee on bull-head should be placed on the outlet steam drop with a top plug which is easily removable so that the producer as well as the

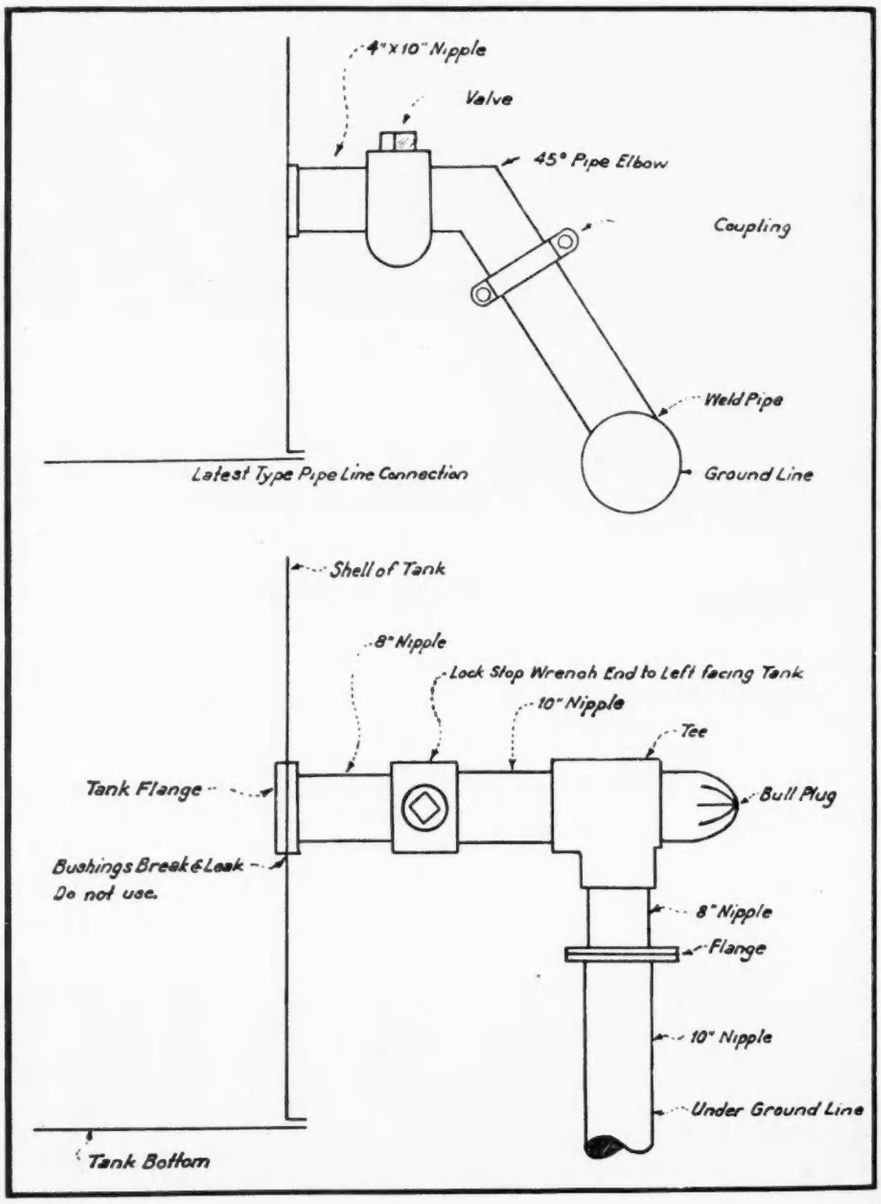


FIGURE 6
Tank Connections.

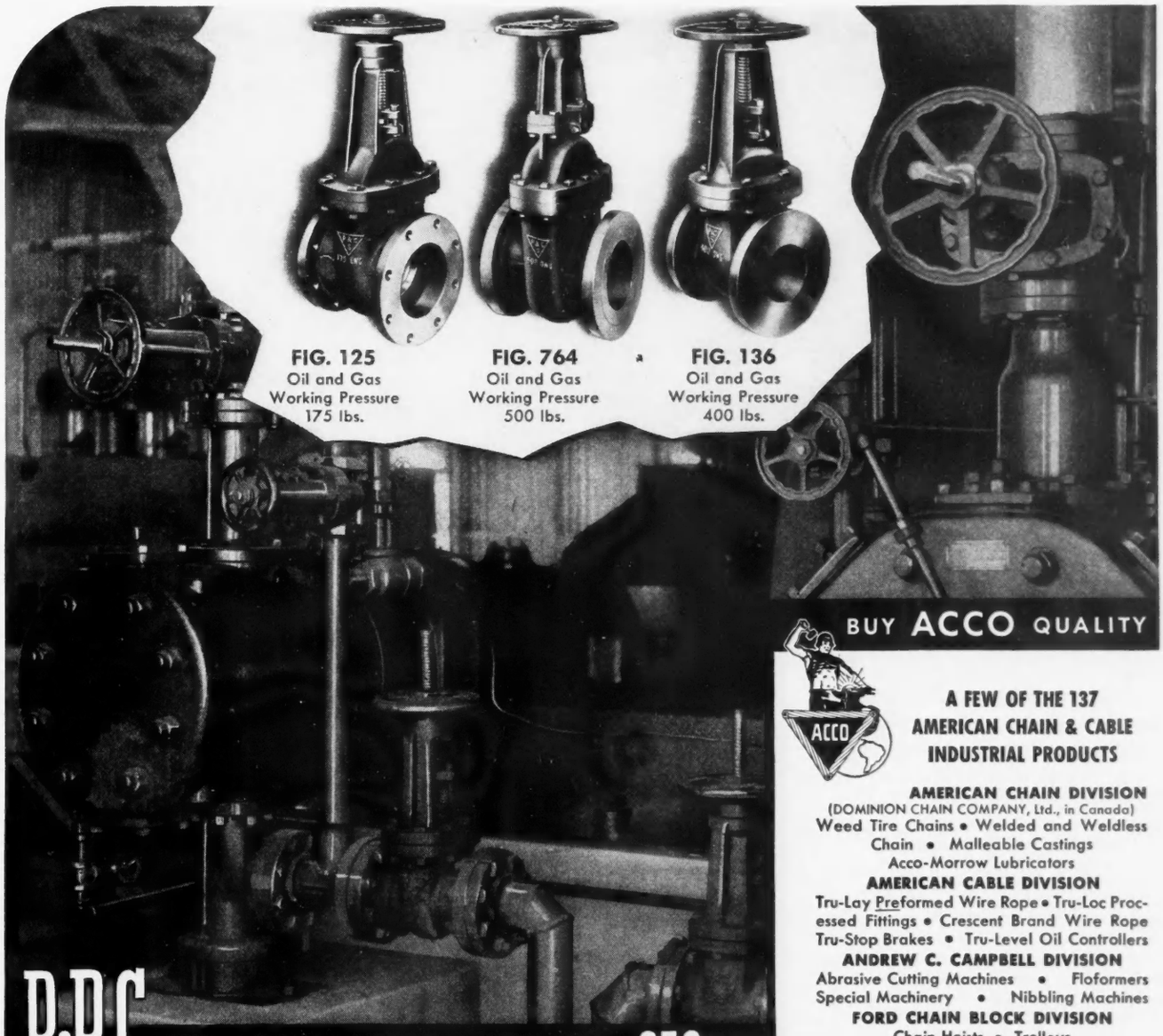


FIG. 125
Oil and Gas
Working Pressure
175 lbs.

FIG. 764
Oil and Gas
Working Pressure
500 lbs.

FIG. 136
Oil and Gas
Working Pressure
400 lbs.

R·P&C Gate Valves operating up to 350 lbs in this Gasoline and Repressuring Plant..

● These Reading-Pratt & Cady Valves are to proven designs, specific tolerances, and of material which far exceeds National Specification requirements.

As the direct result of such design, workmanship and material, the iron gate valves shown in the above installation are continuing, after a period of years, to give trouble-free and dependable service.

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READING·PRATT & CADY VALVES

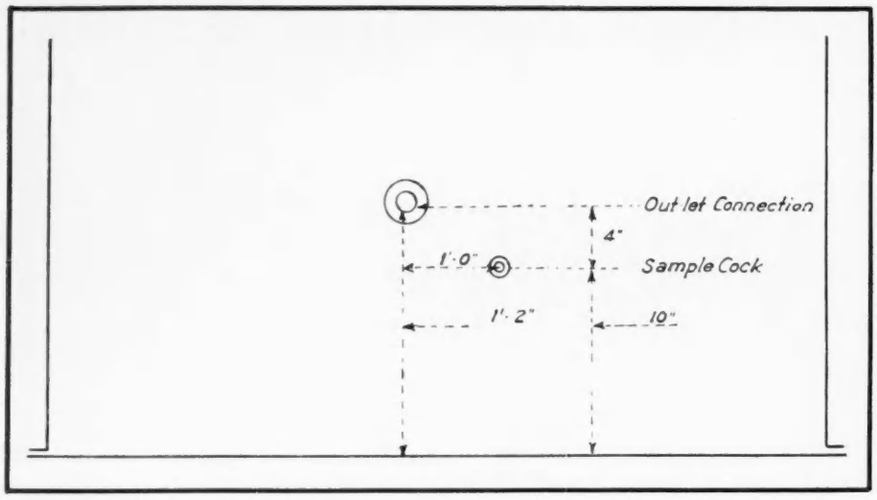


FIGURE 7
Sample Cock.

have four-inch flanges or welds for the pipe line or outlet connection.

In the past these flanges or welds have been placed on the shell of field tanks from six inches off bottom up. An investigation showed that the tank builder always takes his measurements from the top of the bottom of the tank to the center of the outlet connection. This has caused the producer and purchasing companies considerable trouble, and the producer much additional expense in having to raise the connections at a later date as he did not have sufficient room for tank bottoms.

The purchasing companies and A.P.I. consider the pipe line connection from the top of the bottom of the tank to the bottom of the outlet connection, or the actual measurement that this tank would show with connection wide open.

Merchantable oil is required four inches below the bottom part of the outlet connection. Therefore, the producer should have not less than a 14-inch pipe line connection measured according to specifications in the above paragraph. Connections so located gives the producer 10 inches of bottom sediment before a tank has to be cleaned. Pipe line connections in excess of one foot two inches gives the producer as a general rule too much bottom to clean at one time unless they have pits to accommodate such amounts.

Pipe line connection flange hookups are shown in Figure 5.

Pipe Line Connection

Very few purchasing companies have given the pipe line connection on the regular field tank much more than a passing thought. There is, however, a right and a wrong way to make these connections.

The regular type of lock stop should always be placed on horizontal line in a level position with the wrench end, to the left, and the nut and washer on the right, as you face the stop and tank. The stop in this position is always kept tight as the gauger or pumper in closing or opening applies the pressure of the wrench downward turning the stop always in one direction. Stops placed in this manner eliminate a chance of injury which can be had if the stop is placed just the opposite to that described, and the gauger or pumper operating same lifts up on same to open properly or close same. (See Figure 6.)

The flange should be placed on the vertical instead of the horizontal line of the connection, for when the flange is placed in this position the knuckles are not peeled in opening or closing the stop.

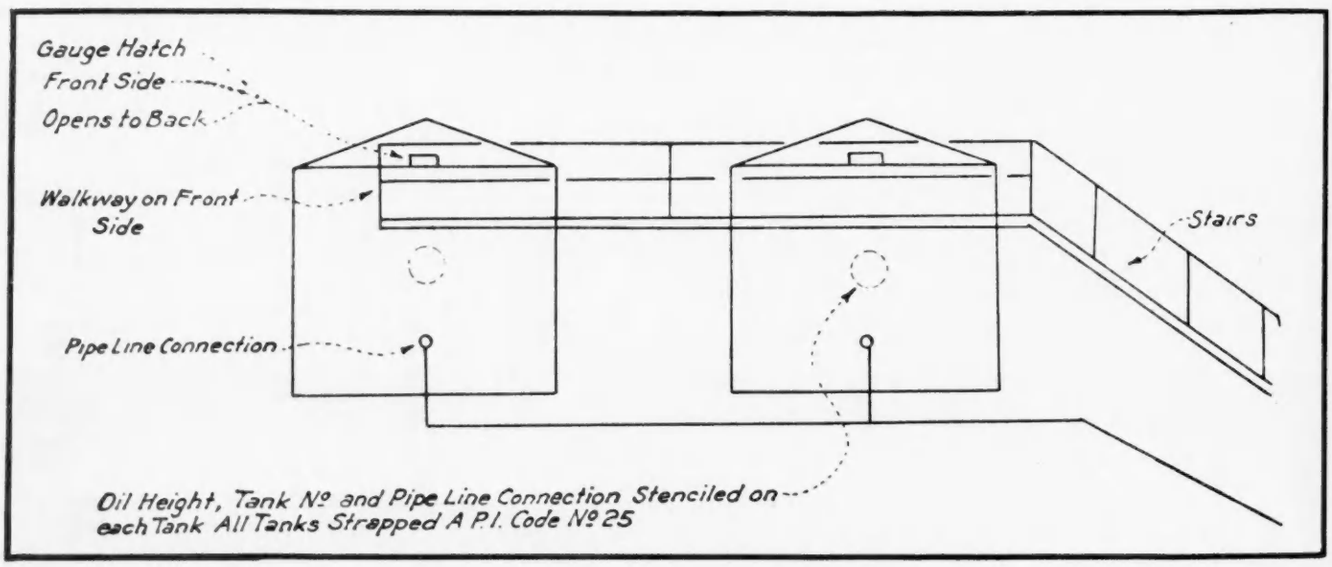
A lease wrench made from a piece of two-inch pipe flattened at one end with an opening that just fits the wrench end of the stop and left at each battery has eliminated dripping stops more than any other method that has been tried.

The cost of connecting field tanks has been considerably reduced by welding, cutting the number of fittings used from seven down to three or four on each tank connected.

Sample Cock

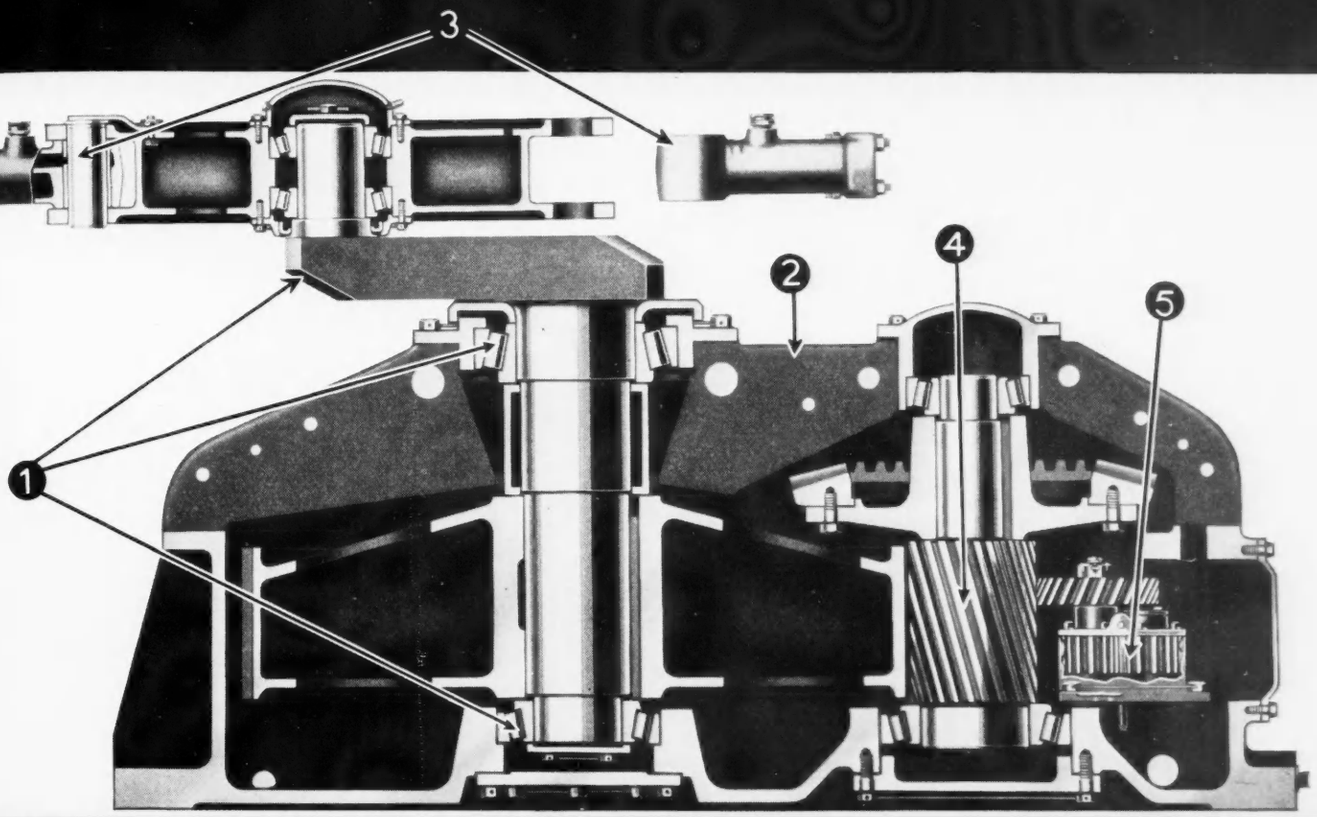
Most producers desire to check their oil at intervals, accounting for the one-inch weld or flange located below and near the outlet

FIGURE 8
Placing Tank Connections.


Gauge Hatch
Front Side
Opens to Back
Walkway on Front Side
Stairs
Pipe Line Connection
Oil Height, Tank Nº and Pipe Line Connection Stenciled on each Tank All Tanks Strapped A.P.I. Code Nº 25

NATIONAL GEARED POWERS

Are Designed for the Most Severe Operating Conditions



1 LOW CRANK OVERHANG AND FAVORABLY SPACED BEARINGS. An integrally forged rotating shaft and crank which brings the pull rod load closer to the case together with a bearing spacing of more than two times the overhang make it possible to provide against the effects of severe overhanging well loads. The rotating shaft is maintained in original alignment, assuring maximum efficiency and minimum maintenance expense.

2 EFFECTIVE LOAD DISTRIBUTION. In the rotating shaft design, it is possible to use the strength of the case to support the load close to the pull rod load itself, and effectively safeguard against deflection or breakage.

3 ADVANCED CONNECTION DESIGN. There is no wear on the eccentric strap from the well connections. This comes entirely on a replaceable bronze bushing of generous size in the connection itself. An unfailing film of lubricant is provided which not only contributes to longer wear, but also reduces friction.

4 HEAT TREATED ALLOY GEARING. Alloy steel heat treated gearing with wide faced pinions of desirably large diameters provide low bearing pressures and long wear.

5 POSITIVE LUBRICATION. All enclosed parts are lubricated by a self-priming positive oil pump effective under all weather conditions and operating speeds. An industrial Purolator filters the oil continuously and circulation is indicated by a gauge that may be located either on the manifold or in the engine house.

NATIONAL

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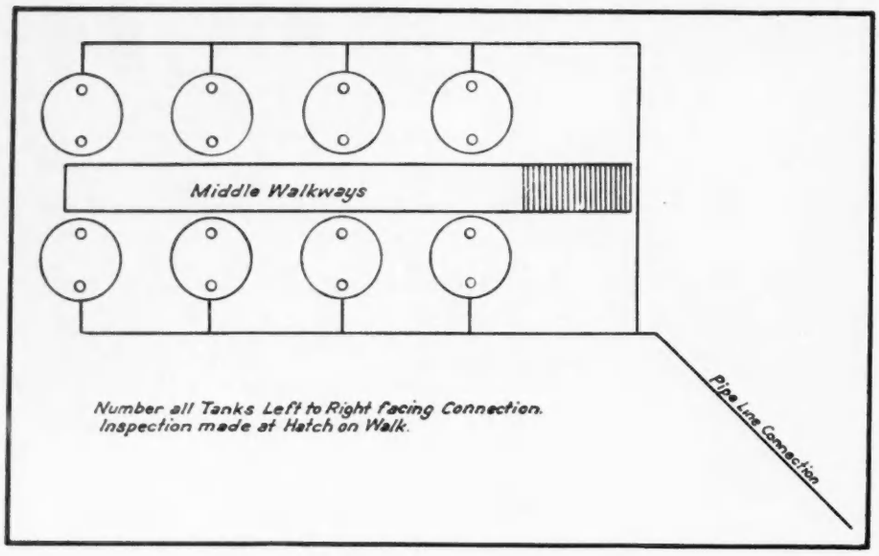

Middle Walkways
Number all Tanks Left to Right facing Connection.
Inspection made at Hatch on Walk.
Pipe Line Connection

FIGURE 10
Double Battery with Middle Walkway.

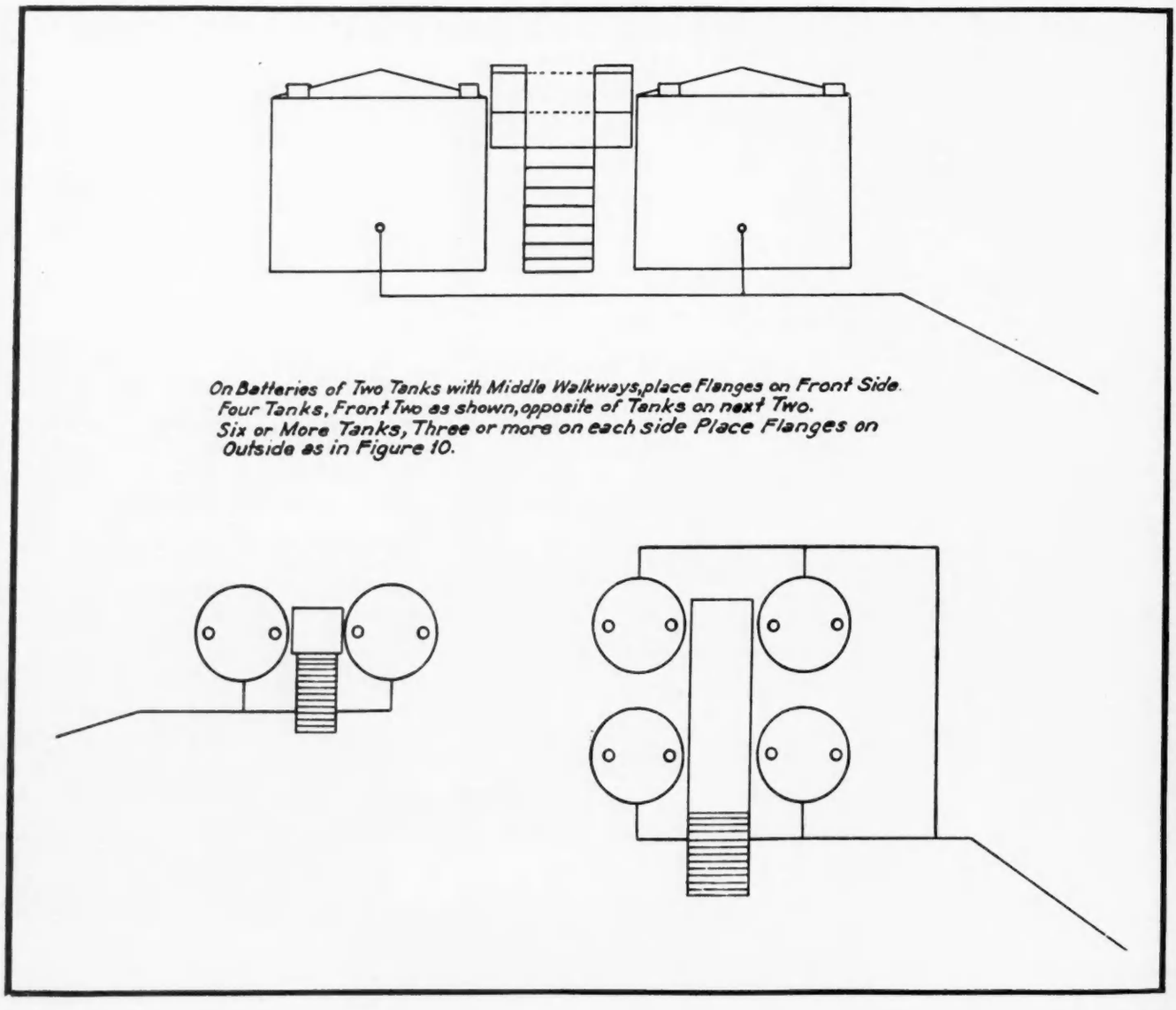
connection. More attention should be paid or given in the placing of this small flange, so that the bottom of same is exactly four inches below the bottom of the outlet flange. It should be located at least one foot to the right of the connection so that the oil will not flow directly on the pipe line connection. If the oil is good at this point, as a general rule it is acceptable throughout the tank. A good method of installing the sample cock is shown in Figure 7.

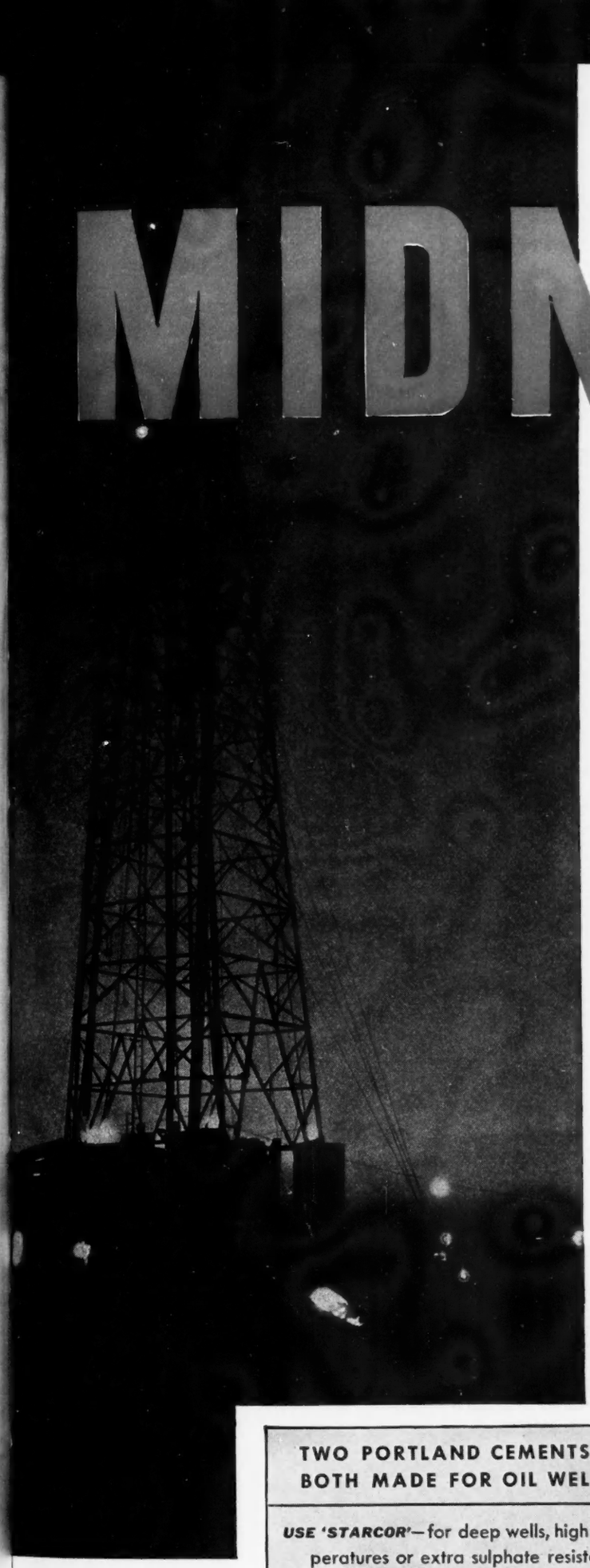
Battery of Tanks Connection

All pipe line connection flanges should be placed on the front side or the walkway side of a battery of tanks, so that the proper pipe line connections may be made by the purchasing company making the connection, as shown in Figure 9.

Where two tanks are set with only short walkways between them, the outlet flanges should still be placed on the front side

FIGURE 9
Tank Connections on Battery with Short Walkway.


On Batteries of Two Tanks with Middle Walkways, place Flanges on Front Side.
Four Tanks, Front Two as shown, opposite of Tanks on next Two.
Six or More Tanks, Three or more on each side Place Flanges on
Outside as in Figure 10.



MIDNIGHT

...AND ALL'S WELL, WHEN YOU USE 'STARCOR'

MIDNIGHT, on the Gulf Coast. Mud pumps have forced 400 sacks of 'Starcor' 8700 ft. down the hole. Bottom temperature, 180 degrees. Yet, the 16-lb. 'Starcor' slurry went down without raising pump pressures above 1000 lbs. Unusual? Not with 'Starcor'—for that's why 'Starcor' was developed. Pumps easily at 15 to 16 lbs. Controlled setting time gives you ample leeway to get it down, even with 200-degree temperatures. No stalled pumps. Proven safety factor protects your investment.

One of three cements that have earned first place in the oil industry. 'Starcor'* for deep wells, high temperatures and extra sulphate-water resistance. 'Incor'* for wells of moderate depth. Lone Star for construction work above-ground. Backed by Lone Star's record for quality, uniformity and all-around dependability—ever since 1900.

*Reg. U. S. Pat. Off.

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USE 'STARCOR'—for deep wells, high temperatures or extra sulphate resistance.

USE 'INCOR'—for wells of moderate depth.

LONE STAR CEMENT CORPORATION

MAKERS OF LONE STAR CEMENT • 'INCOR' 24-HOUR CEMENT • 'STARCOR' CEMENT

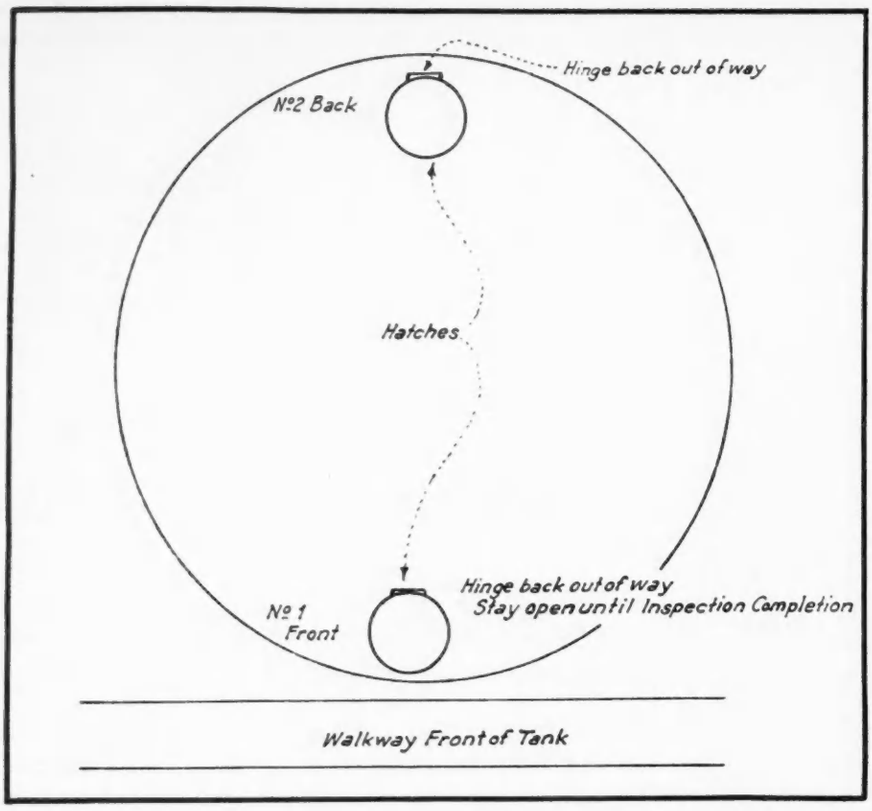


FIGURE 11
Gauge Hatches.

of the tanks and not between the tanks, as has been customary in the past. Connections made in the small space between tanks generally leak and are very hard to make with any degree of satisfaction. (See Figure 9.)

In some cases producers connect two batteries within the same firewall, with one side walkway to service both batteries and the tank flanges directly below the walkway. Where tanks are set in this manner the pipe line or outlet flange should be placed on the outside of each row of tanks so that the proper pipe line connections can be made.

Connections made in close quarters invariably leak, and it is extremely hard for the gauger or pumper to go between such batteries of tanks without bumping his head on the walkways of low batteries or barking his shins on the numerous connections.

With the walkways between the two batteries of tanks and the outlet connection on the opposite side from the walkways of each tank, the gauger makes his inspection from the walkways, checking the pipe line side only at regular intervals to see that the bottom of the tank is not getting high at that point. (See Figure 10.)

Gauge Hatch

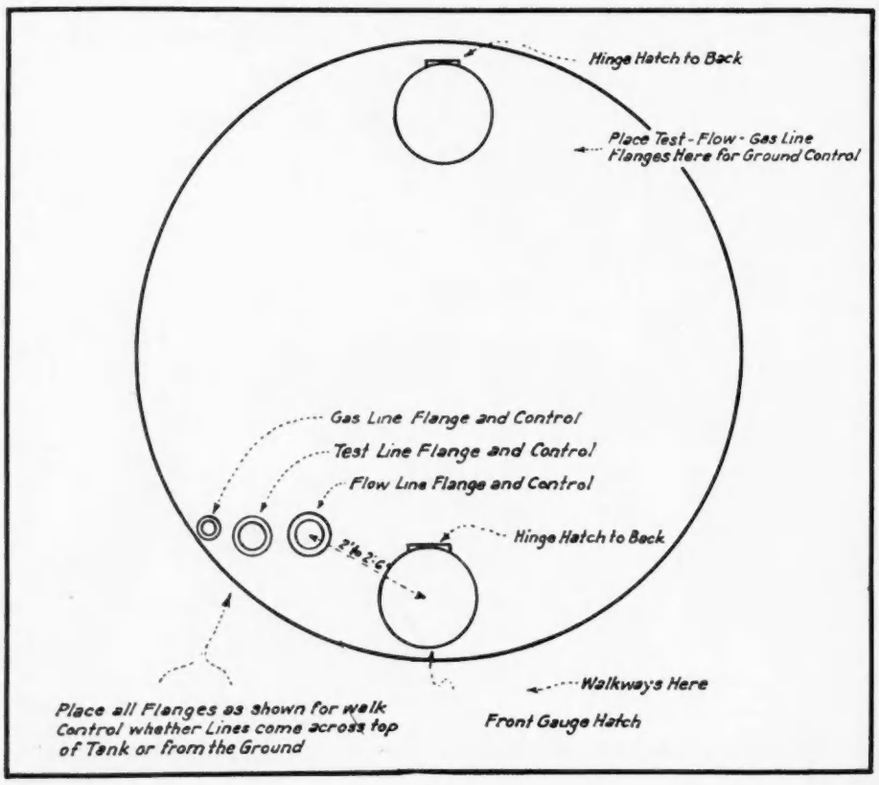
The majority of gaugers work right-handed. The equipment case, carrying everything necessary for the test, should be set at an angle to the right of the gauge hatch.

The front gauge hatch should hinge to the back so that it will be out of the way when running the equipment. It should be so designed that it will stay open of its own accord while the tests are being made. (See Figure 11.)

Gauge hatches are of three types, the round plain type, the round vacuum-pressure arrangement type, both approximately 8 inches in diameter, and the oblong vacuum and pressure type (size 7½ by 18 inches).

The plain type of gauge hatch is preferred on the front or the inspection side of the tank, as they are much easier to wipe up and keep clean. The oblong type hatch has a rest for the thief or sampler, yet it is still too short for a gauger to make his complete inspection therein when using the standard 16 or 18 inch thief. It should be from 22 inches to 24 inches long.

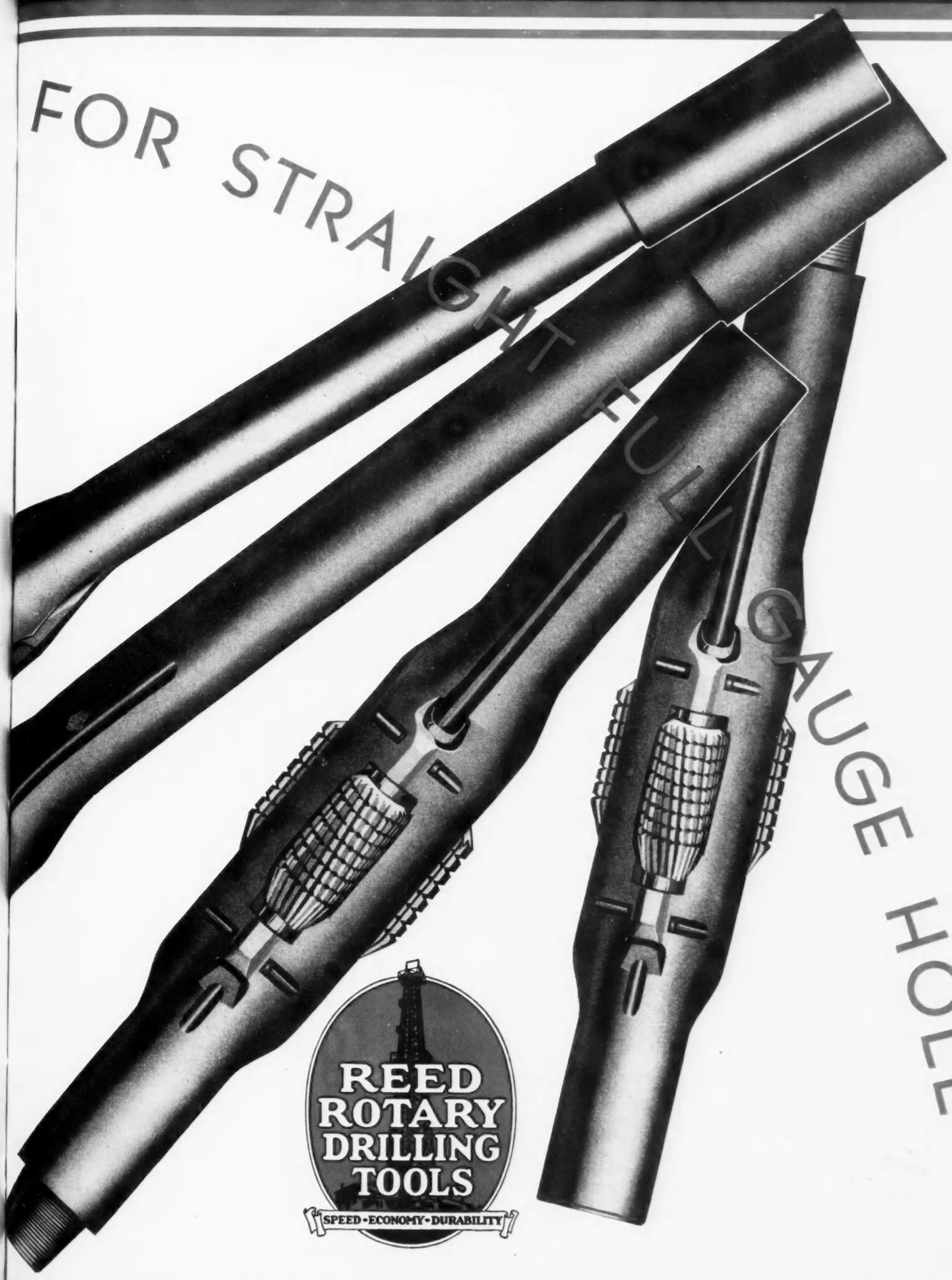
One tank building company has designed a pan that sets to the front, right and left of the gauger hatch, with a skirt or cover that opens up to protect the clothes of the gauger. It is in the way when opened up and cannot be satisfac-


Hinge Hatch to Back
Place Test - Flow - Gas Line
Flanges Here for Ground Control
Gas Line Flange and Control
Test Line Flange and Control
Flow Line Flange and Control
Hinge Hatch to Back
Walkways Here
Place all Flanges as shown for walk
Control whether Lines come across top
of Tank or from the Ground
Front Gauge Hatch

FIGURES 12 and 13
Flow Line Flanges.
Test Line Flanges.
Gas Line Flanges.

STABILIZATION

FOR STRAIGHT FULL GAUGE HOLE



REED ROTARY DRILLING TOOLS

SPEED • ECONOMY • DURABILITY

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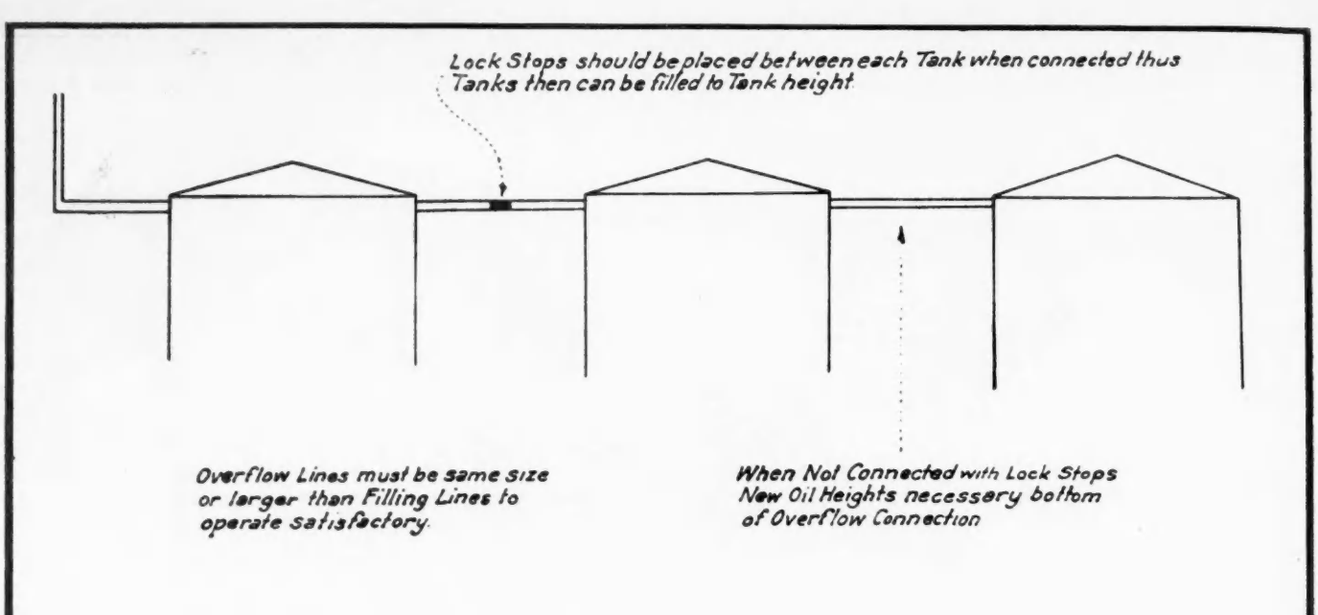

Lock Stops should be placed between each Tank when connected thus
Tanks then can be filled to Tank height
Overflow Lines must be same size or larger than Filling Lines to operate satisfactory.
When Not Connected with Lock Stops New Oil Heights necessary bottom of Overflow Connection
Other Overflow Lines connect at Front or Back of Tanks but operate same principal

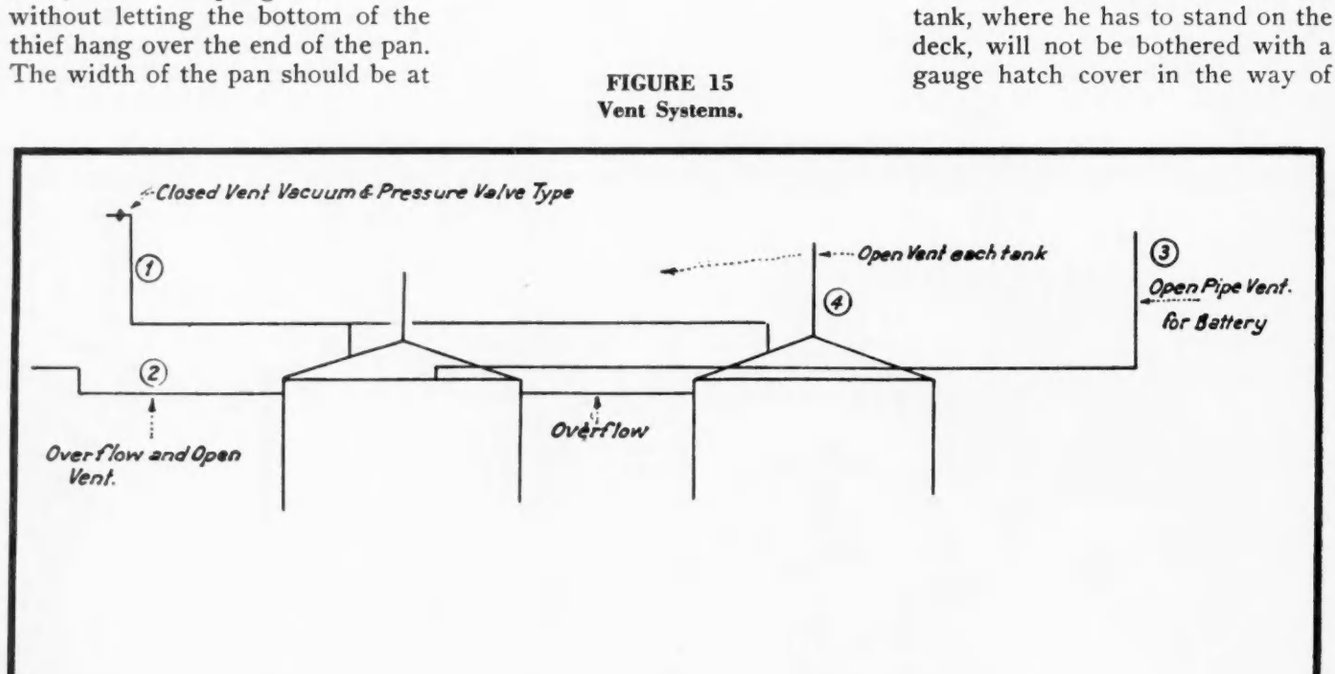
FIGURE 14
Overflow Lines.

torily used from the side walkway unless hinged from the back as a wind-break of the test. The pan idea is very good and will protect the tank tops.

Pans welded around the gauge hatch to keep all the drainage therein are too narrow for a gauger to pour the oil out of a 16-inch thief, when sampling the bottom without letting the bottom of the thief hang over the end of the pan. The width of the pan should be at least 22 to 24 inches from the center of the gauge hatch to the lower right or the lower left hand corner of the welded pan for satisfactory service.

The back gauge hatch should open toward the back or the outside of the tank so that the gauger when making a check of the tank bottom on the back side of the tank, where he has to stand on the deck, will not be bothered with a gauge hatch cover in the way of

FIGURE 15
Vent Systems.


Closed Vent Vacuum & Pressure Valve Type
1
Open Vent each tank
3
Open Pipe Vent. for Battery
4
2
Overflow and Open Vent.
Overflow
2
The Gauge Hatch Vent with Vacuum and Pressure Valves when used should be placed on Back Hatch, keep escaping gas away from Pumper & Gauger
1
Rate Vent Systems as shown

BANTAM Equipped Swivels *Last Longer!*

THROUGHOUT industry there isn't a greater chance for Bantam Bearings to show superior performance than on swivels carrying their tons of pipe extending deep into the earth.

Bantam Bearings are turning in remarkable performance records on this gruelling job. The result is a constantly increasing list of prominent users.

The American Well and Prospecting Company's GUMBO BUSTER 300 TON SWIVEL is completely equipped with Bantam Roller Bearings. These consist of the Main Thrust Bearing, the Upper Thrust Bearing and two Radial Bearings.

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BANTAM
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TAPERED ROLLER • • • STRAIGHT ROLLER • • • BALL BEARINGS

making a satisfactory test to keep the tank top as clean as possible.

The vacuum-pressure type hatches should be placed at these points on the back or opposite side of the tanks from where the regular inspections are made. This keeps escaping gas off the walks and protects the pumper and gauger from the gas from adjacent tanks.

Test Line Flanges

The flow line or test line flanges, or both, should be set to the left 2½ feet from the center of the gauge hatch and slightly back of same, so that both controls can be satisfactorily operated from the walk on the side of the tank, yet not interfere with the gauge hatch or inspection made at same. In some cases these connections have all been placed to the right of the gauge hatch, causing the gauger to criss-cross his equipment making a mess that could have been avoided had the connections been placed out of the way.

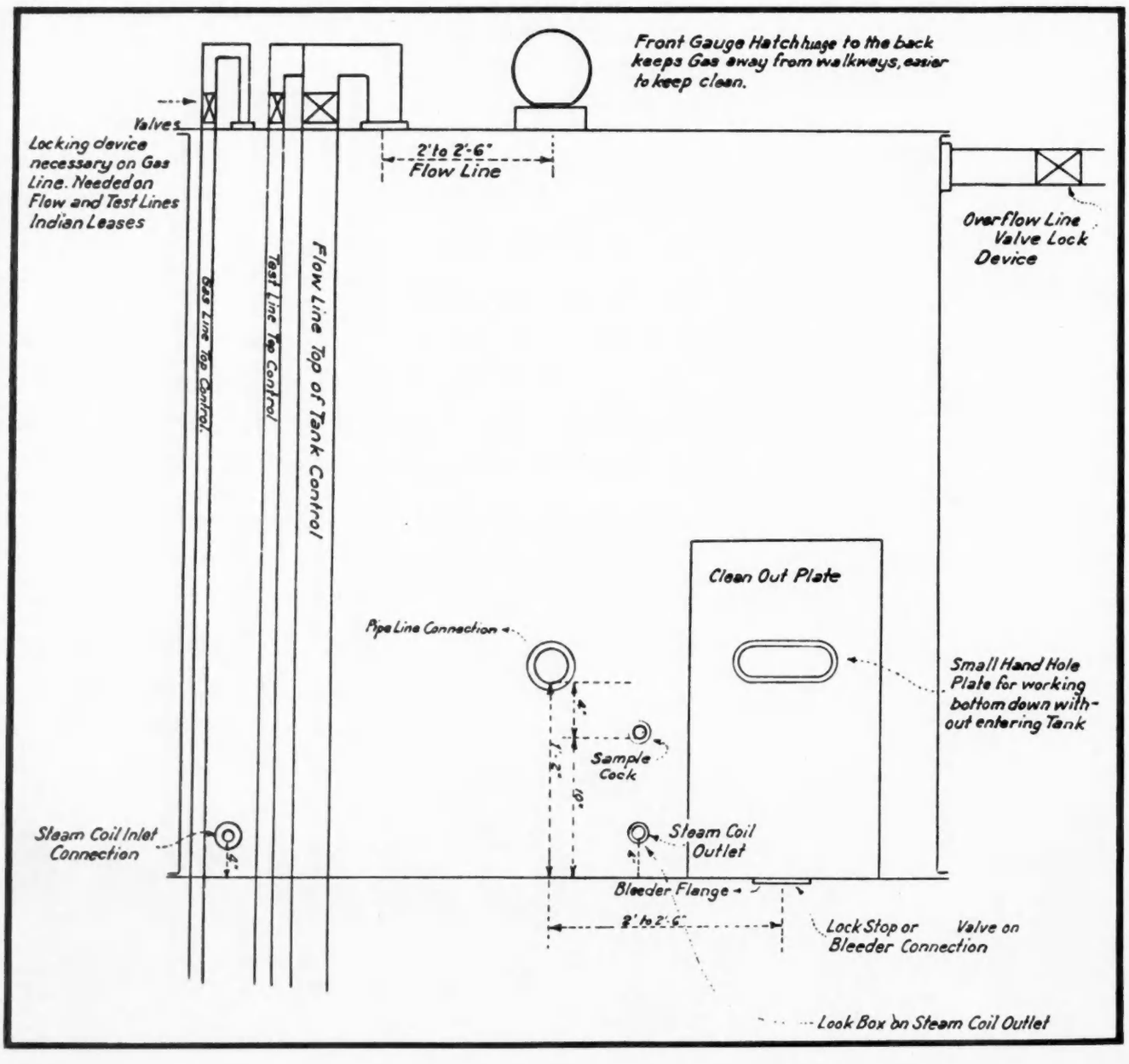
If the oil inspector can follow a regular routine without the interference of an improperly hinged gauge hatch cover, or the connections of the test line and flow lines, he can keep the tank tops in good shape, which is necessary now with the majority of the producers who have found they can have a clean battery and still run oil daily from it if properly equipped. Lock stops are required on flow and filling lines on all Indian Leases.

There are three popular ways or modern methods we might say, for connecting flow lines and test lines to the field tanks, and all can be arranged so that they will not interfere with the gauge hatch. (See Figure 12.)

Gas Line Flanges

In several fields the producers treat their oil by agitating with gas pressure. Separate lines should be installed to each individual tank with lock stops, or locking gas stops, so they can be sealed off while the tank is on the line. We are practicing safety, and accidents are liable to happen to a gauger who has to mount the top of each

FIGURE 16
Front of Tank Control.


Front Gauge Hatch huge to the back keeps Gas away from walkways, easier to keep clean.
Valves
Locking device necessary on Gas Line. Needed on Flow and Test Lines Indian Leases
2' to 2'-6" Flow Line
Over flow Line Valve Lock Device
Gas Line Top Control
Test Line Top Control
Flow Line Top of Tank Control
Clean Out Plate
Pipe Line Connection
Small Hand Hole Plate for working bottom down without entering Tank
Sample Cock
Steam Coil Inlet Connection
Steam Coil Outlet
Bleeder Flange
2' to 2'-6"
Lock Stop or Valve on Bleeder Connection
Look Box on Steam Coil Outlet

. . . Convenient

The 1938 Composite Catalog of Oil Field and Pipe Line Equipment, the most complete Composite Catalog published to date, is now off the press. In itself it is literally a library of the complete or condensed catalogs of approximately 400 leading manufacturers of oil field equipment.

The data in it, written by the manufacturers themselves, is up to date as of January 1, 1938. In a great many instances — in fact, the majority of instances — the various manufacturers' catalogs filed in the Composite Catalog constitute the only catalogs these manufacturers will issue during 1938.

Not only have more manufacturers included their catalogs in the 1938 Composite Catalog than ever before but greater attention has been paid to specifications and detail on equipment necessary to oil men. Increasing numbers have included prices.

The 1938 Composite Catalog contains:

2110 pages over all.

2043 pages of catalog material.

62 pages of indices and cross indices on equipment.

5 postage prepaid postal cards to be used in securing additional information.

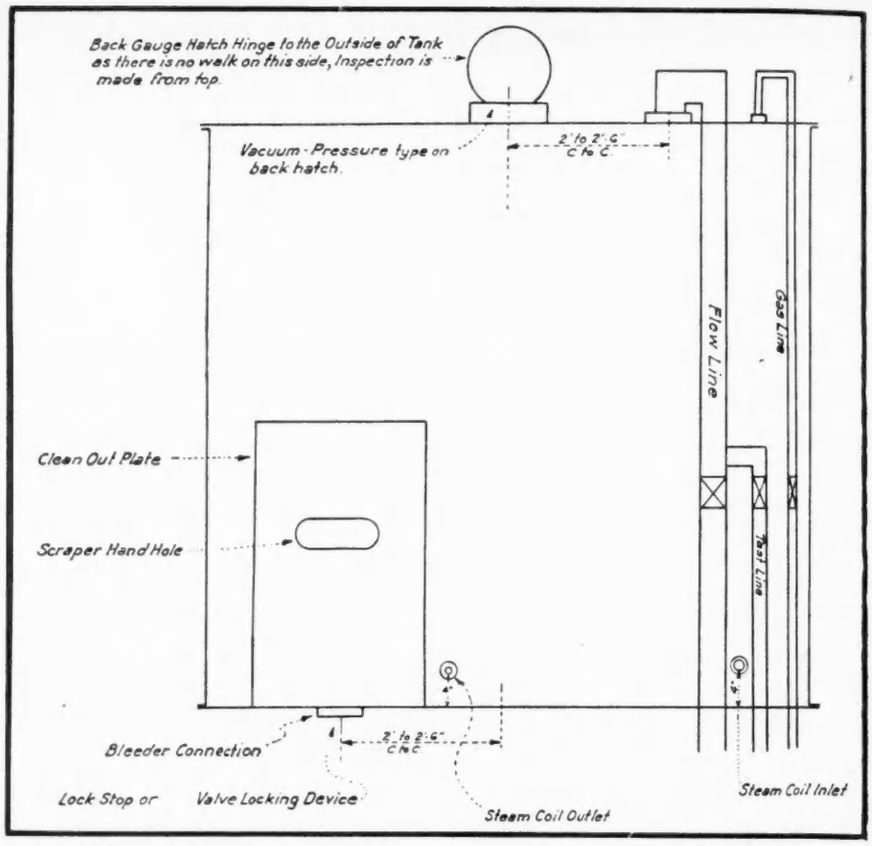
Classified listings of 2,798 different products.

12,456 manufacturers' listings under these various classifications.

COMPOSITE CATALOG

FIGURE 17

Back of Tank Control for Producers' Pipe Line Connections Still on Front Side of Tank.


Back Gauge Hatch Hinge to the Outside of Tank as there is no walk on this side, Inspection is made from top.
Vacuum-Pressure type on back hatch.
2' to 2'-6" C to C
Flow Line
Gas Line
Test Line
Clean Out Plate
Scraper Hand Hole
Bleeder Connection
2' to 2'-6" C to C
Lock Stop or
Valve Locking Device
Steam Coil Outlet
Steam Coil Inlet

tank to seal a gas line off when each run is made. (See Figure 13.)

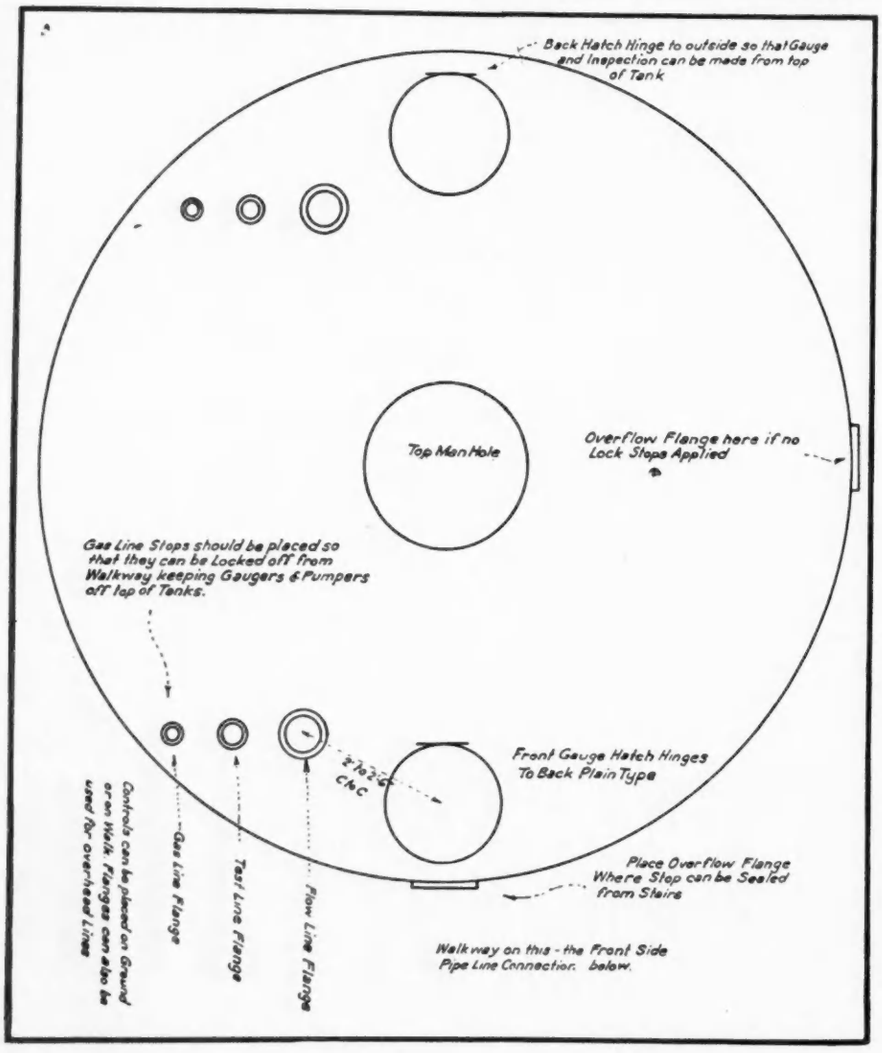
Overflow Lines

Overflow lines as placed between two or more tanks should have lock stops installed, unless the producer desires an additional oil height assigned to the given tank height, as shown in Figure 14.

Vent Systems on Field Tanks

There are several methods of venting field tanks; hatch vacuum and pressure vents, open pipe vents from each tank or from the battery of tanks, and pipe vents from the battery to a single vacuum-pressure arrangement.

The type used is immaterial, however. Oil that is produced under pressure should be run under pressure, and oil that is produced without pressure should be run the same way. There is no question that much of the lighter parts of oil could be conserved, higher gravity kept, if more attention were paid to the venting system on field tanks. (See Figure 15.)


Back Hatch Hinge to outside so that Gauge and Inspection can be made from top of Tank
Top Man Hole
Overflow Flange here if no Lock Stops Applied
Gas Line Stops should be placed so that they can be Locked off from Walkway keeping Gaugers & Pumpers off top of Tanks.
Front Gauge Hatch Hinges To Back Plain Type
2'-6" C to C
Controls can be placed on Ground or on Walk. Flanges can also be used for overhead Lines
Gas Line Flange
Test Line Flange
Flow Line Flange
Place Overflow Flange Where Stop can be Sealed from Stairs
Walkway on this - the Front Side Pipe Line Connection below.

Gauge Hatches

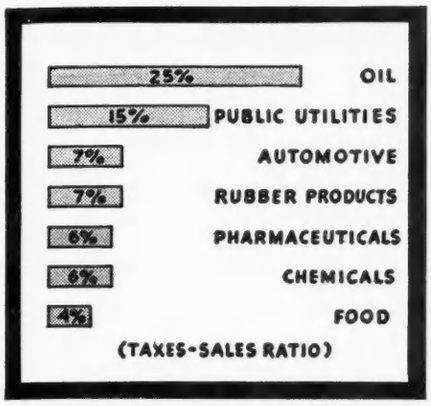
All tanks in excess of 100-barrel capacity should have a front and back gauge hatch so that proper inspections can be made of the tank's bottom. Oil in the majority of the paraffin fields will stack the bottom unless watched very closely, and this cannot be done on a tank with one gauge hatch, of any size in excess of 100 barrels. It is considerably cheaper to have these tanks equipped at the time of purchase with two hatches than to have the back hatch placed on later, with possibly a full tank of oil to contend with.

FIGURE 18
Top of Tank.

Petroleum the most taxed of all industries

A study completed by the National Association of Manufacturers shows that taxes on petroleum products and operations were almost twice as burdensome as the taxes on public utilities; almost four times the taxes on the automotive and rubber industries; and over six times greater than taxes levied on the food industry.

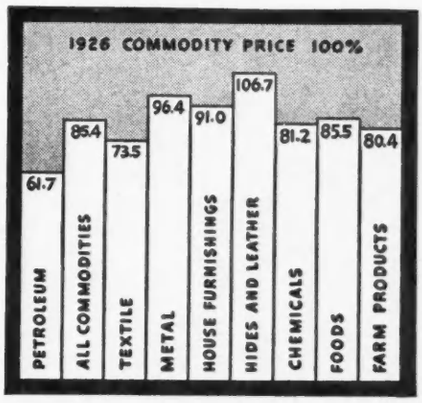
Taxes on petroleum products amount to *11% of ALL Federal, State, and local taxes.*



Wholesale prices of petroleum products show a greater reduction than those of any other commodity

Compared with the commodities listed below, petroleum products show a 38.3% reduction in price since 1926 — being now only 61.7% of that year's level. No other of these commodities has been reduced so low in price or is taxed so high.

The chart below, comparing the commodity prices of 1926 with those of today, is based on data published by the United States Department of Labor.



PETROLEUM ACCOMPLISHED

FOR GOVERNMENT:

The petroleum industry has been actively cooperating with representatives of both the Federal and State governments in conserving the great natural resources — petroleum and gas — with which it deals.

The representatives of the industry have been actively advocating for years the passage of conservation legislation by both the State and Federal governments. It has actively supported the organization of the Interstate Compact to Conserve Oil and Gas, which deals with the conservation of both petroleum and gas.

FOR STOCKHOLDERS:

Stockholders in petroleum companies have had only a modest return on their investment since 1920.

In fact, the annual average for the years 1921 to 1936 shows a return of 1.35% on the annual average investment of eleven billion dollars. The annual average per cent of tax on this investment is approximately 5.34%.

FOR TAXES:

Taxes paid by and through the petroleum industry to the State and Federal governments exceed those from any other industry in the United States. Although crude petroleum is selling at an estimated average price of $1.18 per barrel, taxes have been estimated to equal a total of approximately $1.14 per barrel of crude oil produced.

The petroleum industry remits to Federal, State and other governmental bodies approximately 205 different taxes.

135 East 42nd Street, New York, N. Y.

PICTORIAL STORY OF

Seismic Reflection Shooting

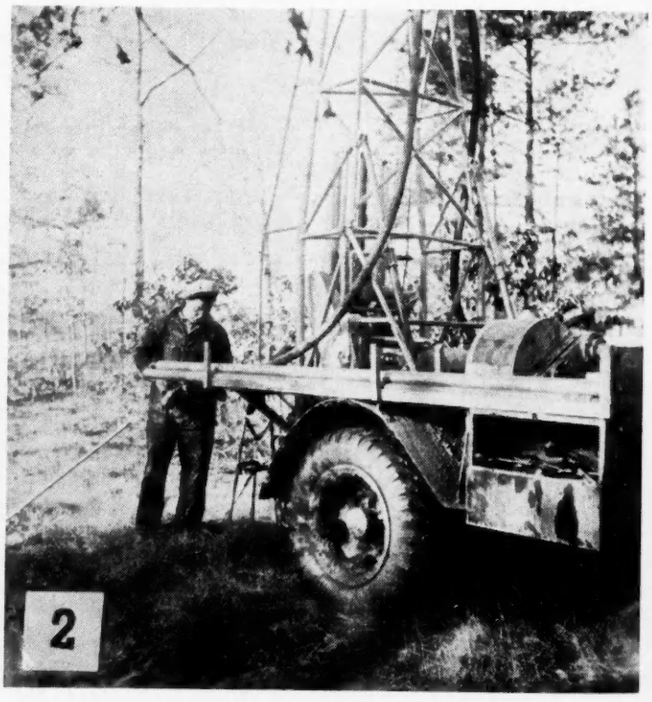
By KURT W. STEINMANN, Staff Writer

THE seismic reflection method, one of the geophysical methods applied successfully for a number of years in locating subsurface structures favorable for oil and gas accumulations, is well known to all oil men. However, there are many who have little conception of the various steps followed by a seismic field party in its daily work. Consequently, presented here is a pictorial story of their field procedure. In the following pictures, one particular type of instrument was used under certain field conditions, therefore the various steps described may vary slightly from those followed by concerns using different equipment and also under different field conditions.

1 **The fleet arrives** at the location. Ordinarily it consists of the drilling truck, water tank car, shooting car and recording truck.

2 **The drilling truck** is ready for operation. The most commonly used machinery for drilling the shot hole is a small rotary drill mounted on a light truck. Depending upon the subsurface formations as well as reflections desired, shot holes are drilled to a depth of from 50 to 100 feet. While drilling, the water tank truck furnishes water for conditioning the hole and for cooling the machinery.

As the velocity of sound in the earth increases with depth, it is necessary at sometime to apply weathering or surface corrections when later computing the records. This is achieved by placing a small charge of dynamite several feet below the surface and about 15 feet from the nearest detector. The time for the sound to travel through the ground to the detectors is measured by recording the shot in the same way that regular shots are made. Through this method it is determined what additional time is required for the sound to travel through the low velocity layer.



3 **A small mud pit** is dug for draining the mud laden fluid drained from the hole. This water is used later to completely fill the hole, which is necessary to assure the dynamite discharged, expanding its energy to the deeper strata.

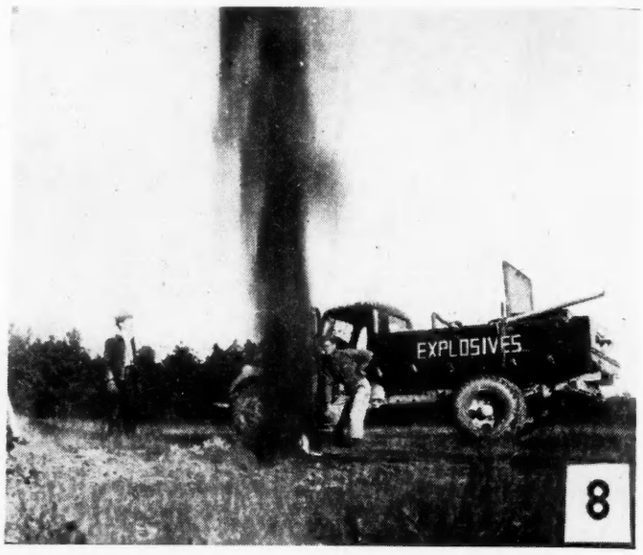
4 **Dynamite** is then pushed down in the hole. The quantity, which usually varies from one to five pounds, depends upon conditions and depth to be reached. After the charge is placed, the mud laden fluid from the pit is drained into the hole, a procedure of considerable importance, as it is common to fire several shots in one hole so as to procure the desired reflections.

5 **Seismometers,** or so-called detectors, are set out at a distance of about 200 feet apart. Many companies are using six detectors, but others use as many as 12. These instruments detect the ground vibrations which generate an electric current in them. The seismometers are either placed on the ground or in small holes provided for them, depending upon their construction.

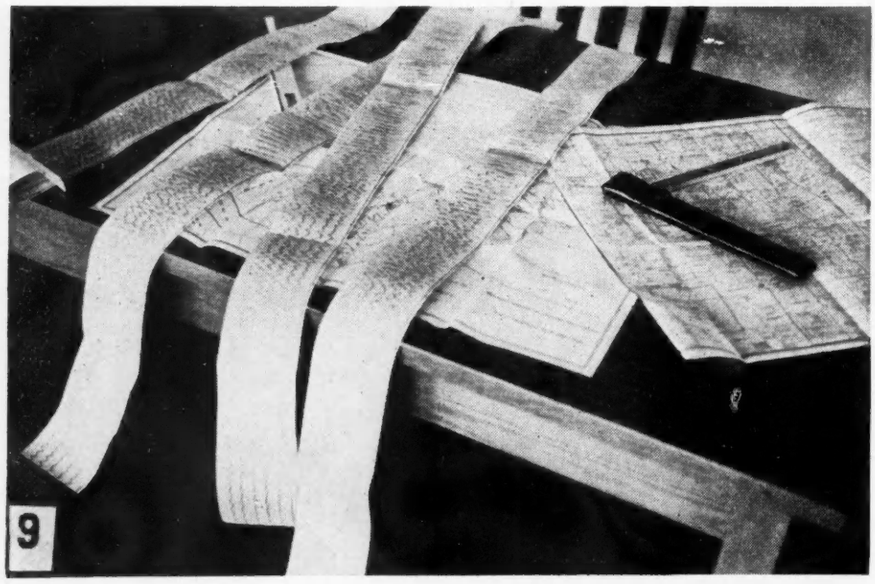
6 **Shooter with blasting machine** ready to set off the dynamite charge. Two of the wires shown lead down to the shot hole, where they are attached to the electric blasting cap. The other two wires are used as a breaker line, and are attached to a wire around the charge and to a battery and switch in the blasting machine. When the shot is fired, the wire around the charge is broken and the current through the breaker circuit is interrupted, causing a sharp electrical impulse that is picked up off the phone line and transmitted to the oscillograph, where it is recorded.

7 **The recording truck instruments** consist of six amplifiers and the recorder with oscillographs, timer and camera. The amplifiers serve the purpose of increasing the weak voltage, generated by the detectors. Each detector has a separate amplifier, and each amplifier has separate power supplies, except for the filament battery. The oscillograph is the instrument which records photographically the electrical vibrations produced by the detector and intensified by the amplifier. Just before the shot is fired, the recording truck operator is in constant touch with the shooter by means of telephone or radio. If the operator finds his instruments working satisfactorily, he gives the order to fire and at the same time turns on his camera paper drive.

8 **The charge is off,** and mud and water are thrown into the air thirty or more feet. Depending on the amount of dynamite used, a short and sharp vibration in the immediate vicinity of the shot hole can be noticed and the explosion heard. A few seconds after the shot is fired, the recording truck operator turns off the paper drive and light switch, takes out the record and develops it in the dark room of the truck. It is then determined if, and how many, more shots will be required in the same hole to get the most favorable or desired reflections.

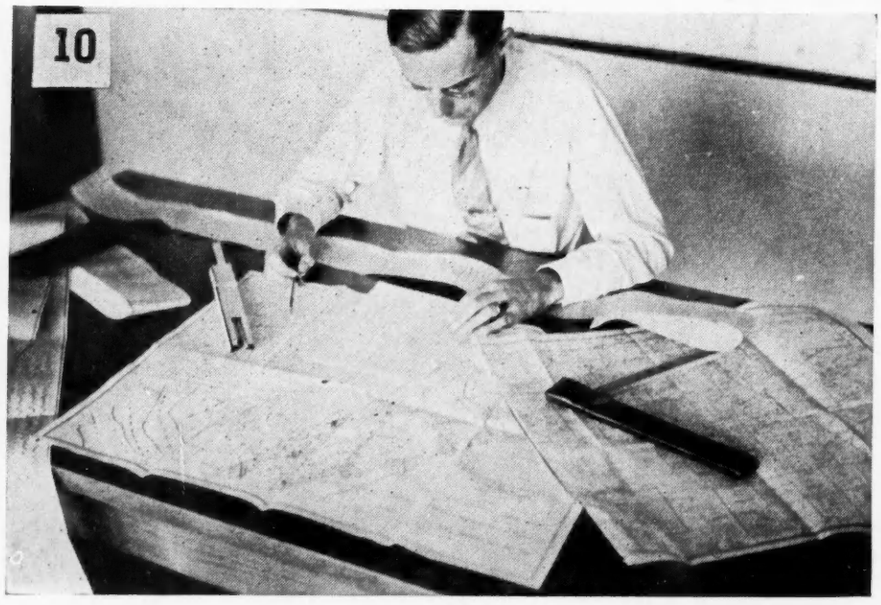


Photographs courtesy American Askania Corporation
Seismograms courtesy Independent Exploration Company



9 **Seismograms** as they appear after having been dried and marked as to date, location and shot. Some operators prefer to leave the records wet and keep them under water until they reach the office, but generally they are dried immediately on racks in the truck.

10 **The record** is then turned over to the computer, who is responsible for the correct time computation of reflected waves. The first step in computing records is to identify the reflections and calculate the dip and depth of the reflecting horizons. Results of these calculations are then plotted on a map, and general picture of subsurface conditions may be obtained. The final phase in this type of work is the interpretation of the data by the seismologist in charge in cooperation with the geologist.



THE *How* AND *Why* OF *Oil Well Shooting*

Paper presented at the Spring meeting of the Mid-Continent District, American Petroleum Institute, Division of Production, Herring Hotel, Amarillo, Texas, February 17-18, 1938. Copyright December, 1937, P. F. Lewis.

By PAUL F. LEWIS American Glycerine Company

WHILE the ideas on shooting, here about to be presented, are comparatively new to well-shooting practice, the underlying principles are understood and widely used in other industries.

Perhaps a better title for this lecture than the one used would be—Methodical versus Dangerous and Haphazard Practices in the Art of Shooting Oil Wells. At any rate, before we discuss the so-called new practices let us first critically and candidly examine the old ones and some of the ideas that went with them.

The art of blasting in all basic mineral-producing industries has kept in step with progress in other branches of such industries to a greater extent than in the petroleum industry. This is probably, in a measure, due to the fact that most other basic industries operate on or near the surface of the earth or under conditions where the results of a blast are visible and can be studied, and where the cost of explosives is a vital and continuous factor in the costs of production. In those industries, one knowing the characteristics of the various explosives available and the nature of the material to be blasted can, by simple arithmetical process, predetermine almost to the pound what will be the yield of material blasted by a given quantity of a certain grade of explosive; consequently, in these industries, those responsible for production volume and cost must be on their toes, they having learned to appreciate that they must understand explosives from the standpoint of how they are constituted and what are their action characteristics in order to enable them not only to choose the proper explosive to give the kind of breakage desired but also how to use them to get that breakage with the least drilling, since the type of explosive and the manner of its use is, in their case—as it might well be in yours—a vital factor in the number of drill holes required, especially in secondary recovery operations.

In the petroleum industry the factor of volume and cost of production is just as important as in other industries, but here knowledge of the art of blasting has lagged behind the other arts employed in every department of the industry. This, you will see, is regretable and to some extent inexcusable but is apparently due to a combination of misinformation and a lack of authoritative information which leaves the production man at sea as to where to begin and how to proceed to formulate an intelligent course of procedure in an operation which often means success or failure, profit or loss; where often a fortune is at stake in a single well.

The oil-well shooter is called upon to shoot hundreds of wells each year under every conceivable condition. In the vast majority of cases he is told—as he should be—to bring so many quarts of nitroglycerine, so many shells of a certain capacity and diameter, so many feet of anchor and a squib or a bomb as the case may be, and he is told to shoot from one certain elevation to another. The torpedo company is, in the majority of such cases, simply engaged to render a mechanical service prescribed and specified by the well owner; consequently, such torpedo company endeavors to place and explode the shot according to specifications, conditions permittting. If the shooter knows from his experience that the shot as specified is not the kind or size of shot which will be most productive or least liable to cause damage he can only call attention to his ideas if he dares. Often, perhaps too often, he keeps his counsel, having found that advice is not always welcome.

How the specifications for the shot were arrived at, the shooter seldom knows. He does know, however, that in many cases there is much disagreement on the subject among interested parties and that the shot is often a duplication of some shot in that locality which happened to give good results.

Consistently good or bad results do not just happen. In the majority of cases there is a definite reason for either. Of course, in shooting his well, the producer, unlike the mine or quarry operator, does not have exactly the same objective or as wide a range of explosives to choose from, nor can he analyze and prescribe for this condition as accurately and as completely, but the indisputable fact remains that as a rule the producer, where shooting is justified, depends upon a shot for the largest practical return on his investment in the well in the shortest practical period of time commensurate with greatest

ultimate recovery, the result of that shot often spelling the difference between profit and loss on a particular well for the big fellow and success or failure for the little fellow.

With his necessarily limited choice of explosives, the producer must look to preparation and to methods of application of the explosive for results, and as it is properly his job to engineer his shots, it follows that he should know something of the action characteristics of the explosive of his choice and how these characteristics are influenced both by natural conditions in the well and by conditions artificially created by him, as it is by these conditions that the effects of a shot are largely controlled.

The record shows that from the birth of this great industry until just a few years ago, the shooting of oil wells was an operation which in many cases was of a routine character in its technique and in the crude devices employed. The practice was briefly as follows: to drill the well to the top of the pay; to call a shooter and instruct him to bring a shot of a certain size, generally to cover the pay from top to bottom, in the meanwhile to drill into or through the pay so that the shooter could, as soon as the last bailer of mud and cuttings was dumped, lower his shot to the desired point in the well, using until recently a reel which he generally clamped to the flywheel of the drilling engine. Then the torpedo was covered with a few feet of water which was intended to serve the dual purpose of tamping to confine the shot and at the same time to keep it from burning the sand. Then the shooter exploded the shot with a squib of one kind or another, and that was all there was to it.

The shot either came out or it did not, depending upon the size of the shot, the amount of water or oil in the hole or whether or not the hole caved and bridged. In any event, the next step was to clean out the well, to gauge it and to get it on production. If the shot helped the well, everyone was happy and patted each other, including the shooter, on the back. If it didn't help it, everyone, while disappointed, accepted the results on face value and hoped for better luck next time. If the shot reduced the production or injured the well in any respect the explosive was condemned. If the casing was damaged or if anything else went "haywire" the shooter was cussed. If the shot came out and spewed oil, water and rocks all over the countryside the shot was a "humdinger" whether the production was increased or not. If the shot did not come out but if there was enough sand bailed out after the shot to fill a gondola car, it was still a good shot even though the production was not increased thereby, but; if on the other hand, there was little or no sand to clean out, both the shooter and his explosive were condemned, even though the production was materially increased.

While this mild criticism is directed at the producer, it is not intended to be an alibi for the torpedo company. Knowing explosives, as they should, it was and is their obligation to their clientele to pass on to those engineering shooting operations all essential information, and meanwhile to keep their own house in order by equipping themselves to do their job efficiently.

In this section of the country, shooting practices have, in many respects, been revolutionized during the past few years, to the mutual advantage and betterment of all concerned.

The outstanding changes are built around three principal factors: First—the proper confinement of shots by means of solid tamping which automatically eliminates the dangerous jack squib; Second—the concentration of a suitable quantity of explosives for wider effective range, and Third—an entirely new type of shooting equipment which takes much of guess and hazard out of the mechanical operation.

Let us now hold each of these factors up in the light of experience and examine them from their broad aspects.

The Sand Tamped Shot

The principle of the sand, gravel or cement-tamped shot is as old as the history of industrial explosives and the advantage of adequate stemming (tamping) and proper confinement of explosives has long been understood and used, but it was not until about seven years ago that the practice of using solid stemming was introduced to the oil industry and advocated for general use to obtain better results in oil wells than had previously been possible with the then prevailing practices in the use of liquid stemming.

Those who first introduced the practice often met with icy stares and no little ridicule, but by persistent effort and the good results from occasional test shots, got the movement started and going with ever increasing momentum. Today, it is estimated more than 85 percent of all production shots in the Mid-Continent are tamped with solid material such as sand, chert, gravel, crushed stone or cement. This trend, obviously, is not due to high-pressure salesmanship, as no one could be fooled on a proposition of this kind more than once or twice. Results, and results only, are responsible for this general acceptance of and change in practice. Now, lest you get the wrong impression, please believe that any torpedo company or shooter advocating the use of this method or any change from old methods has little or nothing to gain therefrom other than your esteem and the satisfaction that a man gets from a job well done. Actually the so-called sand-tamped shot means more labor and expense to him; therefore, when a shooter advocates the sand-tamped shot with honesty of purpose and knows what he is talking about, "give the Devil his dues" by crediting him with a desire to be helpful.

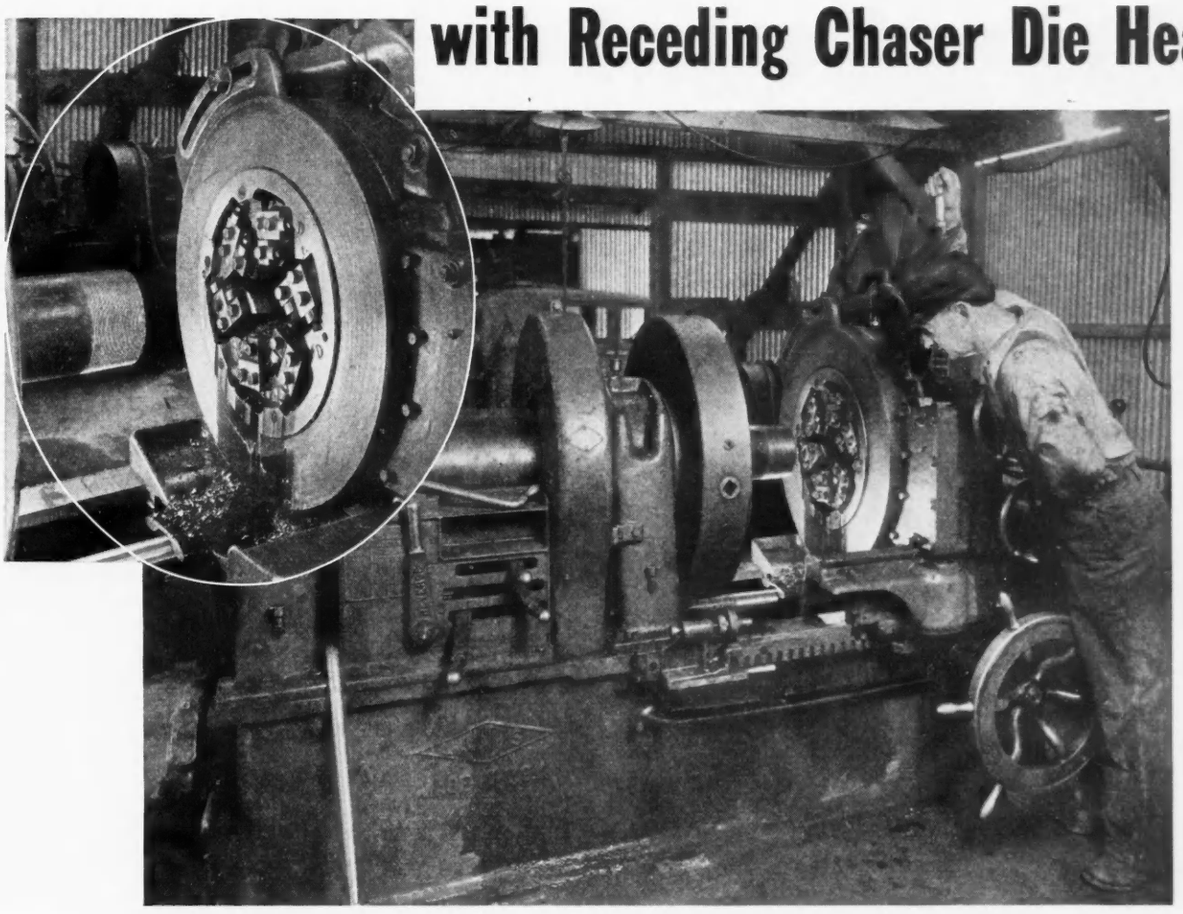
Time does not permit and there is no need to here bother you with the rather lengthy details of sand-tamping practice or technique as all that has been written on the subject has probably already come to your attention either through reading the bulletin "Oil Well Shooting, Theory and Practice and the Sand Tamped Shot in the Light of Experience," or through other means; but, if you have any questions on the subject the speaker will be glad to attempt to answer them in the discussion following this paper or after this meeting.

The Concentrated Shot

It has been the idea in the past that the explosive column must cover the entire thickness of the pay formation from the bottom to the very top, regardless of the amount of explosives used or the relative diameter of the bore hole and the torpedo, it apparently being thought that unless this were done only that part of the pay in immediate contact with the explosive would be affected by the explosion. It was therefore probably assumed, erroneously, that whatever the effect of the explosion, such effect would be only on a horizontal plane or lateral radius from the hole.

Experience has taught us, and

LANDIS Pipe Threading and Cutting Machine with Receding Chaser Die Head



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If you want the maximum in accuracy, speed, and economy in threading oil tubular goods, follow the example of the Oil Tool Exchange, Long Beach, Calif., and install a

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In this typical oil field shop, set-up changes are frequent and all classes of material from low carbon welded pipe to Grade D seamless, are handled. In fact, the only condition which never varies is the fine finish and accuracy of their threads, and the speed and economy of their LANDIS equipment.

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a moment's reflection will convince you, that as the forces set in motion by the explosion of a torpedo must operate in conformity with physical laws, these forces like any others, have the natural pronounced tendency to follow lines of least resistance or media of greatest conductivity. This, in a nutshell, means that when an explosion occurs, there is a chemical reaction of almost inconceivable speed and intensity in the process of which energy is evolved which transmits and expends itself with equal force in all directions. No matter how deep the well, if the shot be properly confined, the demonstrable effect is first outward, horizontally and then upward. This in turn means that if the force of the explosion cannot leave the hole by traveling up through it because of an immovable body above and below it, it projects itself into and through the walls of the hole around it, thus in the case of a properly tamped shot the primary effect is to pulverize the walls of the hole and fracture the rock on a nearly horizontal plane.

With these points in mind it becomes at once apparent that the more complete the confinement above the shot and the greater the volumetric density of the explosive used, the more far-reaching will be the initial lateral effect. Coincidentally, if the confining means be sand, any disruptive waves traveling vertically upward will be quickly dampened and destroyed before they can damage the pipe or any tender strata overlying the pay stratum since it is known that sand is an effective vibration dampener, whereas, liquids, especially water, are effective vibration carriers.

Still bearing in mind the elementary physics involved, it must be apparent to you that where there is a considerable thickness of pay stratum, reasonably homogenous and free of faults, and a desire to economize in the explosive to be used, it is folly to string this explosive from top to bottom of such pay zone, especially if the shot be poorly confined. In such cases, to begin with, if the shot be poorly tamped, the hole above the explosive is the line of least resistance; hence, it is apparent that the force of the explosion, like a Roman candle, immediately starts upward and outward to do more harm above the pay than good in it. It is this action that is often responsible for caves, for broken pipe, broken shoulders and for expensive clean out jobs, many of which are never licked and are therefore a source of continual expense, and, in some cases, the cause of lost production. The explosives available for deep well shooting purposes are only those having, under conditions of practical use, an extremely high velocity of detonation, therefore, the effects from a shot can be said to be proportional to the pressure impact of a suddenly applied blow of crushing intensity in the immediate shot area, consequently, if the torpedo be one of small diameter the pressure or blow to the surrounding walls will be light and, conversely, if the torpedo be one of large diameter the pressure or blow will be proportionately heavy. In other words, the effect of a small-diameter torpedo, regardless of the total amount of explosive involved in the shot, can only have a brushing effect with a fracturing reach of narrow scope, whereas a shot of the same quartage contained in shells of large diameter will have a fracturing range correspondingly wider. To illustrate the point with round numbers; if we had 10 feet of pay to shoot and elected to shoot it with 1 quart per foot, that would necessitate the use of 10 feet of 2½-inch shell. About all we could expect from the primary radial action of that shot would be a slight local pulverization of the wall to chip or scrub it, and a relatively narrow fracturing radius. If, however, the same quartage were contained in a 5-inch shell there would be 4 times as much explosive per foot of hole and consequently the surrounding walls would be struck a blow which would reach out to tap the oil stratum correspondingly harder.

This, of course, brings up the questions—What about the productive sand which was not in contact with explosive? The answer to that is simply that if you should properly shoot a concentrated shot in the lower half or two-thirds of your pay the effect will be to shatter the entire pay sand without increasing the size of the bore hole above the area occupied by the explosive, without damaging the casing point and without, as a rule, damaging the casing.

An example to illustrate the point is seen in surface blasting. In quarry practice, where the horizontal coyote hole at the base of the cliff is the explosive chamber, large quantities of explosives are concentrated at points in the lateral tunnels where the burden above the tunnel and above the floor of the quarry is more effectively broken than if the same burden had been shot with vertical well drill holes. Where the stone lays in horizontal laminations the back break on an upward inclined plane from the tunnel is sometimes equal to the height of the quarry face. Extensive back break occurs unless a row of shearing holes are shot with the main shot to cut a perpendicular face. Here the concentrated shot not only saves real money in drilling cost but better breakage results from less powder, which, in turn means less secondary blasting and expensive delays incident thereto.

These results indicate that the ultimate effects of the blow of underground explosion is most apparent upward and outward not because one explosive shoots up and another down, as some seem to believe, but because that is generally the line of least resistance, and the only directions in which the effects are manifested to the unaided senses.

In well-shooting practice we have much similar conclusive evidence to support the belief that the same results are obtained in a modified degree as, for instance, in cases where the shooting of deep wells producing from a low elevation helps wells producing from an entirely different and higher elevation as much as two locations distant from the well shot. On the other hand we have no record or knowledge of a shot in a well at one elevation helping another well at a lower elevation.

An example more convincing to you is one resulting from a series of experiments conducted right here in the Panhandle on the speaker's recommendation.

A prominent production executive, who, like many others, had been more or less following precedent on shooting practices but who has an analytical and receptive mind, saw the logic in the reasons advanced for modifying his practices so that he might obtain better results at a lower cost, and decided to experiment with the concentrated shot in a number of wells. You may draw your own conclusions from the results which are here given in his own figures.

"Up to November 2, 1937, 10

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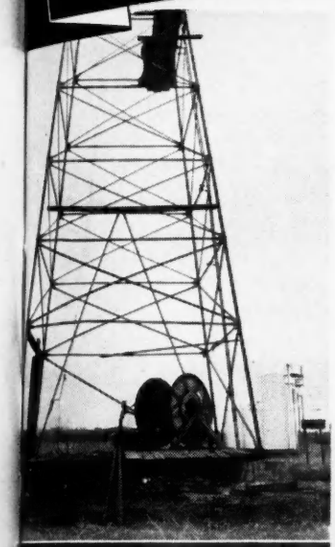
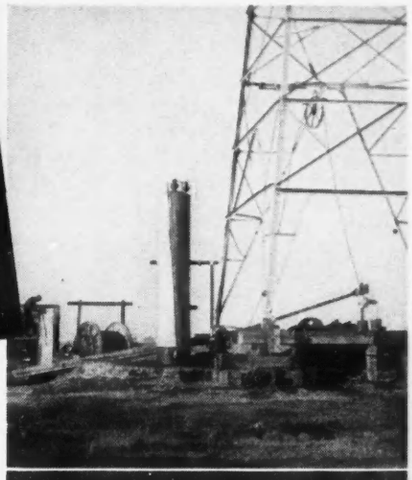
FOR INITIAL PUMPING EQUIPMENT

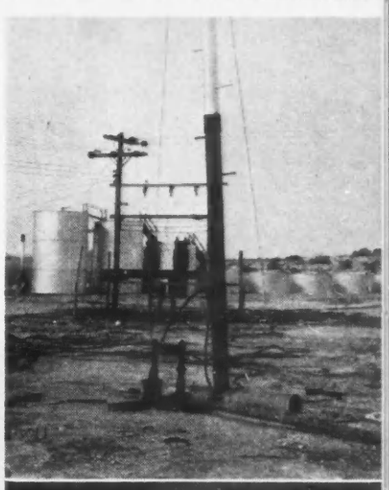


Pumping since April 4, 1930. Elbing Field Butler Co., Kansas. Estimated seven years production 9,000,000 barrels fluid.

Producing 1976 bbls., of fluid per day from approx. 1,400' Elbing Field, Kansas.

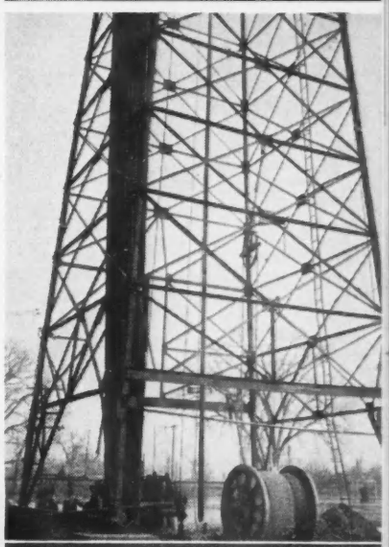


A recent installation at Iowa, La. Producing 3,600 bbls., of fluid per day.

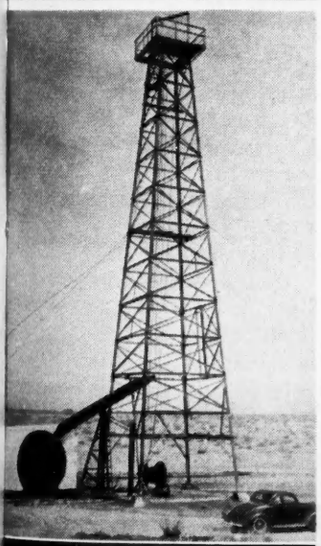


Well previously abandoned. Revived by Reda, now pumping 826 bbls., fluid per day. Pecos Co., Texas.

Automatically producing allowable of 32 bbls., per day by intermitting, from 3286'. Mentone Pool Loving Co., Texas.



One of 162 Reda installations in the deep Oklahoma City field.



Lea Co., New Mexico. Installed 1931, present production 3,270 bbls., fluid per day.

St. Louis, Okla. Producing 2460 bbls. fluid per day from 4161'.

The installation of Reda as original or replacement pumping equipment will put your wells on a more profitable basis, because smaller original investment per well is required; the unit can be adapted to suit changing well conditions at less expense; a lower lifting cost per barrel of oil, will be maintained throughout the life of the well.

See composite catalog, pages 1752-53

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wells had been shot by the new concentrated-shot method, shooting only 2/3 of the pay. The comparative results of shooting by this method versus the old method are:

"1. New Practice averages 6.19 per cent less explosive per well.

"2. Average decrease shooting cost per well 6.75 per cent.

"3. Average increase in initial potential of wells to date 19.45 per cent.

"4. Average gas/oil ratio per well reduced 18.94 per cent.

"5. 26.79 per cent more explosive placed in lower 2/3 of pay than formerly used in same footage."

This gentleman further reports it is evident that by this practice of concentrating shots, oil strings of casing can be set from 10 to 20 feet closer to the top of the oil pay than in the past, allowing much free gas and in some cases troublesome shale breaks to be cased off and permitting better well completions.

What Happens When An Explosion of Nitroglycerin Occurs in a Well

Reference has been made in the foregoing text to primary and secondary effects of properly confined shots which probably requires further explanation.

Observation of the results of shots of various sizes, coupled with the known action of explosives, makes it clear that where the best practical confinement is obtained by proper stemming, the effect of an explosion is twofold, which for the purpose of this discussion, let us designate as the "primary" and the "secondary" effects.

Now picture in your mind a well in which stands a column of nitroglycerin 100 feet in length attached to or connected with a time bomb at the top of the column and the explosive confined by a practically immovable body of sand, gravel or other solid material above it.

While the velocity of detonation of nitroglycerin is as high as 23,000 feet per second and seemingly instantaneous, it is nevertheless apparent that at that velocity the time required to explode this 100 feet is 1/230 of a second. With that in mind it is apparent that when the wave of detonation is started down through the column of explosive by the explosion of the time bomb the development of energy starts from scratch but as the wave of detonation moves downward at terrific velocity, the pressure increases until it reaches the ultimate maximum intensity at the bottom of the column or the bottom of the hole.

Now then, because of the high velocity of the explosive it has an immediate effect on the surrounding rock along each foot of the explosive column which is comparable to a blow from a mighty hammer proportional in weight or intensity to the diameter of the explosive column. It is this blow that has the intense local effect of increasing the size of the hole and causes local fracturing radially from the hole and this effect may be said to be the "primary" effect. Recalling that the explosive is confined and that pressures develop cumulatively at high velocity toward the bottom of the hole, then it becomes apparent that this rush of power in motion, commonly known as kenetic energy, acting somewhat as does a shell out of a cannon, strikes the bottom of the hole with terrific impact, the magnitude of which is almost inconceivable. This power surge strikes the practically immovable bottom and is there deflected or reflected back toward the surface in waves of motion which increase in radius as they incline upward at an angle of about 45 degrees unless refracted by strata varying widely in density. This action is comparable to a puff of smoke or a jet of water projected against a hard surface.

The impact of this power surge, unlike, the reflection of light, loses some of its force in the reflection, nevertheless, in a shot of considerable size the reflected force is sufficient in its initial stage to cause sufficient movement of the overburden as to fracture it in a radius proportional to the elasticity of the rock and to amount of explosive used, its volumetric density and the degree of its confinement.

It is the effect of this action that you sometimes feel at the surface, commonly referred to as the "bump on the ground," this "bump" being always of greater intensity at a distance from the well than close to it, such distance varying more or less in proportion to the depth at which the explosion occurred. That may be said to be the secondary effect of the shot and its scope is dependent on the size and volumetric density of the shot, on the dampening or absorbing characteristics of the rock, as well as on the degree of confinement afforded by the tamping.

From this it becomes evident that if there be improper or insufficient tamping that it will move up and out of the hole as soon as the pressure of the exploding shot exceeds the resistance of the tamping and that the force of the explosion will, at least in part, follow that same course since that course will then be the line of least resistance, so that the secondary effect will be largely destroyed because the pressure developed cannot accumulate.

An analogy is seen when a gun is fired. If the muzzle is free of obstruction the projectile leaves the gun without injuring it because the shell moves forward in the gun as soon as sufficient pressure develops behind it. If, however, the muzzle were plugged the pressure in the breech would accumulate and burst it.

Effects of a Properly Engineered Shot

There always has been and there probably always will be disagreement as to the objective and the results of a nitroglycerin shot, though the most generally accepted theory is that the object is to increase the reservoir at the bottom of the hole while at the same time, fracturing the rock to permit freer flow of oil to the well.

There is ample evidence to support this theory. However, among those who accept this theory and who operate in water-drive territory, there are some who seem to be under the impression that the cracks resulting from the shot are very much larger than they really are, in fact large enough to cause water to run through them so freely as to trap oil rather than drive it before it. This conclusion is apparently faulty as it seems logical to assume that to create crack space, material must first be displaced in direct proportion to the amount of crack space. As we are dealing in this case with a practically immovable body it would seem to follow that such cracks, or more correctly "fractures" as are formed by the shot, even a short distance from the hole, must of necessity be so fine as to be practically invisible and that they serve only to increase the permeability of the rock and at the same time to fracture the impermeable walls of cavities which trap oil which would otherwise be unrecoverable through the action of

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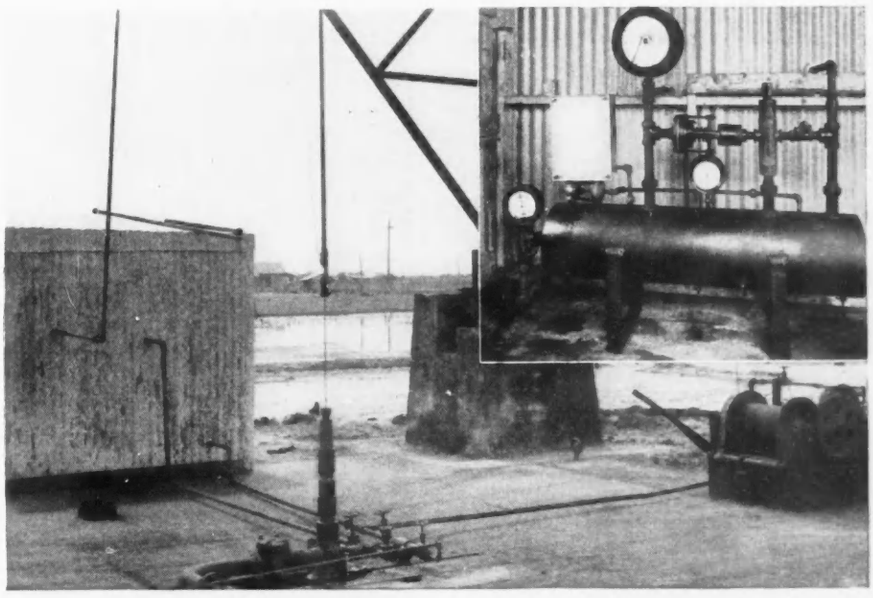
Vol. 1 | Houston, Texas, March 7, 1938 | No. 3

SINGLE MAN OPERATES 60 NIXON GAS-LIFT UNITS

Only slight duties required to keep wells on continuous production



Nixon Surface Control Gas-Lift Installation. The insert photo at upper right is the Intermittent Tank Assembly, which is housed in the shed at left of main photo.

One Southwest Texas Company is enjoying a new production economy record by operating 60 units of the Nixon Surface Control Gas-Lift System, with one man, according to reports reaching the Wilson Supply Company this week.

The single operator's duties are slight, consisting principally of keeping the units in operation by making occasional minor adjustments on the intermitter, which is above ground. The producing downtime on these wells from all causes averages around 2% per month.

Simple as this operation is, it is not at all unusual. The Nixon Surface Control Gas-Lift System was designed with the idea of raising more fluid at less cost, and the success of this accomplishment is attested by the highly satisfactory operation of the more than 100 units now installed.

The intermittent tank assembly automatically releases and shuts off the flow at regular intervals.

The valve-opening weight is raised and opens the flow valve which allows pressure between tubing and casing to enter tubing and raise fluid to the surface. When the fluid reaches the surface, pressure in the weight raising cylinder is released so the weight lowers and securely closes the valve.

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natural forces. Such fractures would scarcely lead to a degree of channeling which would affect ultimate recovery to a seriously detrimental extent.

Size of Shot

A question frequently asked is: What size shot should we use and how can this be determined?

There is no satisfactory formula for this problem nor do I believe it possible to devise one which could have very satisfactory general application, since each well is a separate problem that must be engineered to meet particular conditions in that well.

Generally speaking, dolomites and sandstones require harder shooting than limestones because the former are more elastic or less frangible than the latter.

With these factors in mind in shooting dolomitic and sandstones, the size of the shot in quarts should be determined by the thickness and homogeneity of the stratum and the frangibility of the stone, remembering that the infrangible stones, be they hard or friable, require harder shooting than the frangible stones because such infrangible stones, as the term implies, have the facility to absorb and dampen vibration waves whereas the harder, fine-grained, highly-cemented stones, being less elastic or more frangible, fracture more readily.

In shooting limestones in general it is well to bear in mind the fact that many lime wells are injured by shooting because they are sometimes shot too heavily. There is a natural tendency to shoot heavily because the stone drilled hard and slowly, consequently, it was erroneously assumed "the harder the stone, the bigger the shot" without considering that in dealing with the effects of a blow such as is transmitted by an explosion, hardness in a stone must be considered in relation to its frangibility, tenacity or elasticity rather than in relation to its hardness as reflected in drilling speed.

The majority of limestones are highly frangible, much more so than sandstones or dolomites. To illustrate the point, a non-vitrified clay vessel is only slightly frangible and quite elastic whereas a fine china vessel is highly frangible and quite inelastic. One is soft and the other is hard, yet the soft material when administered a light blow by a light hammer will only crumble at the point of impact while the same blow administered to the china vessel will shatter it completely. To carry the analogy a step further, if materials of the character of these vessels were sandwiched between layers of other materials and held immovably in place as is the pay stratum in a deep well and corresponding blows were delivered to their respective edges, the clay vessel would be pulverized at the point of impact and cracking, if any, would be of a local, superficial scope, whereas the china vessel would be cracked for a considerable dstance in all directions radiating from the point of impact.

Therefore, it would seem, in view of the above, and in the light of experience, that the shot should be engineered to meet the condition as you find it, giving due consideration to the characteristics of the rock you are shooting, to the character of the strata above and below it, as well as to the mechanical equipment in the well.

In our experience in the field we find that dolomites respond best to heavy shooting, some operators find it advantageous and economito drill into dolomite with holes of largest practical diameter and where for some reason or other they drill-in with a small hole, they spring the saturated pay section to increase the shot capacity of the hole where the shot will do the most good.

Wells producing from sandstones generally respond best to heavy shooting with shells of the largest practical diameter that the hole will safely accommodate, especially where the sand is spongy and poorly cemented.

Limestones are generally best treated with shots of about one half to two thirds the quartage per foot of pay used in sandstones, depending on conditions in the pay stratum, such as breaks and faults.

As has been stated, each well, so far as the size of the shot is concerned, presents a separate and distinct problem which can best be worked out on the ground where all the factors involved are known and understood.

It is impractical in the extreme to lay down any scheme which can have general application or which can be wholly depended upon. There is, however, a persistent demand for some formula which can be used as a guide. To meet that demand the following formula and chart is offered for what it may be worth:

Formula:

$$L = \frac{VW + S}{E} = \text{Quarts Explosives}$$

Explanation:

L = Effective Volume of Overburden (100 ft.) × Weight per Cu. Ft. overburden + Crushing Str. of Limestone ÷ Explosive Energy per Quart = Quarts required

Example: Assume a shot to cover 20 feet in a soft lime in 8-inch hole and that a 70 foot radius would be the effective range, then:

V = depth × area or 100 × (0.7854 × 140^2) = 1,539,384 cu. ft.

W = volume of overburden × weight of overburden (150 lbs. per cu. ft.) or 1,539,384 × 150 = 230,907,600 lbs.

S = area of shot zone (2 pi r h) × crushing strength (8750 lbs. sq. in.) or 6048 × *8750 = 52,920,000 lbs. sq. in.

E = explosive energy at ** 4,000,000 ft. lbs. per quart (60% of potential which is 2,000,000 foot pounds per pound 100% explosive) Hence

$$L = \frac{230{,}907{,}600 + 52{,}920{,}000}{4{,}000{,}000} = 70 \text{ quarts}$$

Basic Safety Rules Governing the Shooting of Wells

These rules are respectfully suggested in the interest of safety and economy. In preparing these rules, the writer appreciates the practical impossibility of devising inflexible rules which will meet every condition and contingency, however; in view of the hazards and the vast investments involved it is felt that the following fundamental rules should be followed where conditions permit.

1. When a well is properly completed to the shooting stage and perhaps the success or failure of the shot spells the difference between profit and loss, that is the time for deliberate forethought and adequate preparation. When a well has been gotten ready for a shot "make haste slowly," examine your log carefully and examine flags for bottom of hole; bottom and top horizon to be shot; top of liner, if any; casing point; fluid level and points of possible trouble, such as sharp bends in casing, caves in open hole, shoulders, etc., etc.
2. When the shooter arrives at the well, take nothing for granted. Look him over carefully. Examine his equipment carefully as follows:
   (a) Inspect torpedo line and reel and be sure there are no flaws and that the reel runs true.
   (b) Inspect reel brakes and brake operating mechanism, making certain they are in perfect operating condition.
   (c) If in doubt as to ability of shooter or the condition of his equipment, require him to run and bottom a dummy shell of the size and weight of the loaded shells to be used.
   (d) Only steel torpedo lines should be used in wells having a depth of 3000 feet or more.
   (e) If shooter and equipment pass your inspection, give him all information in your possession

as to the condition and characteristics of the well and its equipment. The shooter is entitled to be fully informed if he is to carry out his part of the job safely and effectively.

(f) Water jacketed or non-metallic shells should preferably be used for production shots, if the hole is dry, the explosive to be used is liquid nitroglycer and if the depth exceeds 3500 feet.

(g) If difficulty is experienced in running of steel measuring line due to the magnetic attraction of lode stone, insulated or non-metallic torpedo shells should preferably be used to prevent unhooking of the shell before it is properly bottomed.

3. The shooter should not be required to do anything which he informs you is contrary to safety rules and to good practice. In the event that a shooter informs you that your instructions to him conflict with his orders, consult his superior before requiring him to comply with your instructions, remembering that his orders are designed to safeguard the operation and your property.

4. If a shooter requests permission to explore the well by running his cage or a dummy shell, he should be permitted and encouraged to do so, since it is possible that floating material or other obstruction which would not stop a bailer or the tools may and sometimes does stop a torpedo shell, causing it to unhook and become wedged, generally at or near the fluid level with danger of causing an explosion when attempts are made to dislodge it. In all deep wells it is considered good practice to run a dummy torpedo whether the shooter requests permission or not, this operation serving the dual purpose of testing out the shooter and his equipment as well as the conditions in the well. It is time well spent.

5. The shooter must in every case be required to test his shells by filling them with water as soon as he arrives at the well and water should be left in shells until ready for actual use. (This applies to torpedo shells for liquid nitroglycerin only.)

6. Before shooter is permitted to remove any nitroglycerin from his car, all spectators (persons not employed at well at the time) should be required to withdraw to a safe distance (at least 600 feet) and the number of employes in the danger zone reduced to the lowest practical number.

7. Shooter should be supplied with a bucket of water in which to place corks, temporarily removed from nitroglycerin cans while nitroglycerin is being poured into torpedo shells. When the last torpedo has been lowered, the water should be poured into the well and the bucket thoroughly flushed to remove all traces of nitroglycerin.

8. Shooter should not be permitted to have more than enough 10-quart cans on floor of rig at one time than required for one run of shells and empties must be returned to his car immediately after being emptied and before additional full cans are brought from car.

9. Shooters should not attempt, be compelled or permitted — except when extraordinary conditions prevail—to do any of the following:

(a) To shoot a well during an electrical storm.

(b) To shoot a flowing well at night; however, where avoidance is impractical ordinary rig electrical illumination should not tbe used lest a flow be ignited by a broken circuit. Flood lights located at a distance from the well or automobile headlights are safer.

(c) To run more than 30 quarts in one run except where exigencies leave no choice.

(d) To run a shot into any well not equipped with a control head.

(e) To intentionally float either a shot or a bomb to bottom.

(f) To run together a bomb and a torpedo shell except when exigencies leave no choice.

(g) To run a shell larger in diameter than will leave an annular space of ½-inch—a 4-inch shell in a 5-inch hole, etc.

(h) To open boxes of solid explosive or to remove cartridges less than 50 feet from the drill rig or the boiler.

(i) To leave cartridge paper or box lining paper on the lease at the completion of the operation. Such paper should be burned in a suitable container at a safe distance from the well—never in the firebox of the boiler.

(j) To fill a gelatin dump shell while shell is suspended in drill hole where it is possible to set such shell in the cellar. When shell must be suspended in hole to fill it, space between shell and casing and between casing and rig floor should be covered to avoid loss of spills.

(k) To use a jack squib in a well more than 1000 feet deep or containing more than 300 feet of dead fluid.

(l) To lower a torpedo at a rate in excess of 250 feet per minute.

10. The official in charge of the well at time of shooting should witness the testing and the final setting of the timing and firing mechanism of the time bomb before exploders are attached, to satisfy himself that there is no error of omission or commission which may result in failure.

11. When shooter has bottomed shell and has presumably unhooked, he should be required to reel up not more than 100 feet of line and then again to test his line to make certain that he has unhooked from the shell. This operation should be repeated until all doubt is removed.

12. If, by any chance, it should be found impossible to unhook from a liquid nitroglycerin torpedo or if a torpedo becomes wedged in the hole so that it cannot be bottomed, it should not be pulled to the surface while loaded. In such cases, a bleeder should be run to puncture and drain the shell, while immersed in water or oil and the empty shell then withdrawn with a set of grabs after filling the hole with oil or water. If it is impractical to fill the well with oil or water, at lease a 2-inch stream of oil or water should be run into the well while the empty shell is being withdrawn. After shell has been withdrawn, it must be immediately destroyed by the shooter by exploding it at a safe distance from the well (not less than 600 feet). No additional explosive is to be run into the hole until it has been thoroughly washed down, explored and found to be clear.

In connection with these rules, it must be considered that while the responsibility for the condition of its equipment and the conduct of its employes rest with the torpedo company, it is to be remembered that it is the property of the well owner that is involved and must be safeguarded and that the use of nitroglycerin under even the most favorable conditions and in the hands of the most careful operative is a more or less hazardous operation.

My counsel to you above all things is: no matter what size the shot, no matter what the condition of the pay or how deep the well, you get the best possible results from your investment in the shot if you properly confine it by proper tamping; as you thus compel it to do useful work where you want it done, rather than harmful work elsewhere. The only exception to this rule is; that when a well, new or old, is being squibbed from top to bottom of pay to free the wall pores of mud or to scrub it free of other substances which coat the wall. In such cases, cleaning out costs can be saved by tamping only with enough liquid for air seal so that the well can clean itself.

In conclusion I would like to leave the thought that the question of well shooting and of oil well explosives has been so beclouded by mystery and misinformation which has been too readily accepted that there is hopeless confusion of thought on the subject where any thought is given it. I therefore urge that you seek and study the available data on shooting and on explosives and that you approach your shooting problems in the light of such information and as a matter sufficiently important to have the serious consideration of your engineering organization.

Proper Lifting Equipment

SELECTION AND INSTALLATION

By FLOYD L. SWINDELL, Engineer

SELECTION of the proper type of pumping equipment is one of the most important and at times one of the most difficult of the many problems with which the oil producer is confronted. Due consideration must be given the fact that artificial lifting costs, over the economic life of a property, will range from a few cents to more than $1.00 per barrel. Equipment physically suitable during the early stages of pumping may prove entirely inadequate both physically and economically before the ultimate conditions have developed. Opinions among production men differ widely on this subject, as is well illustrated in several of the Mid-Continent oil pools which have passed beyond the flowing stage. However, there should be no issue taken with the statement that, regardless of the equipment selected, if it be improperly installed, the investment is an unwise one and can result only in inefficient operation and possibly in a premature economic limit. It is with the latter phase of the pumping problem that the following discussion is primarily concerned.

Under the heading, "Improper Installation", may be included such points as inadequate and poorly designed foundations, misalignment of equipment, improper preliminary planning of layout, lack of consideration of ultimate conditions and other features probably of lesser importance. In the examination of quotations for equipment installation, the prospective purchaser can well afford to be closely critical of those figures dealing with foundation design and costs in connection therewith. This feature should be rated equally as important as equipment specifications themselves. Therefore, the problem resolves into two principal divisions: (1) selection of equipment to meet the ultimate conditions; and (2) the proper installation of that equipment.

Consideration of Ultimate Conditions

Armed with the best information available, the production man still is faced with a problem involving many variables in his consideration of probable ultimate conditions. This subject is so wide in its scope that space will permit here nothing more than a statement of the problem along with the mention of some of the considerations involved. In a majority of producing structures, oil moves toward the well under the influence of gas energy. Even after the period of natural flow has passed, many wells continue to yield gas in quantities and at pressures sufficiently great to assist materially in bringing oil to the surface. Unless wells make large volumes of water initially, it is seldom that more than a small part of the ultimate load is contended with during the early stages. As is the case in many pools, wells which have been shut down after daily or monthly allowables have been obtained, load up with water and for relatively short periods of time, when pumping is resumed, develop loads which may closely approach the ultimate condition. Most pools which yield water ultimately develop a "paraffin condition" which also adds to the normal operating load. It is not the intention herein to encourage the purchase of equipment having rated strength greatly in excess of anticipated loads. However, experience has taught that in many cases, equipment selected on theoretically determined ultimate loads, where no safety factor has been included, has proven inadequate. Much of the equipment purchased early in the history of pumping in the East Texas field ably illustrates this contention.

During recent years the contract installation of oil field equipment has become so highly competitive that even reputable contractors are forced to take "economic short cuts" which they know to be lacking in engineering soundness. One of these "economies" practiced not only by many contractors but by producers when they install their own equipment, is the use of large amounts of large fragments of limestone and sandstone to supplement the usually more expensive standard mix concrete. In recent months inspection has revealed several foundation failures very evidently due to the use of overgenerous amounts of large pieces of rock. In one specific instance, where an 8500-pound gear box had been set into an expensive installation, the foundation failed at ground level and resulted in the loss of about 10 days production as well as an expensive repair job. An examination of this failure revealed the use of several large fragments of sandstone near the ground level. The fracture plane or plane of failure was found to cut through the foundation roughly parallel to the

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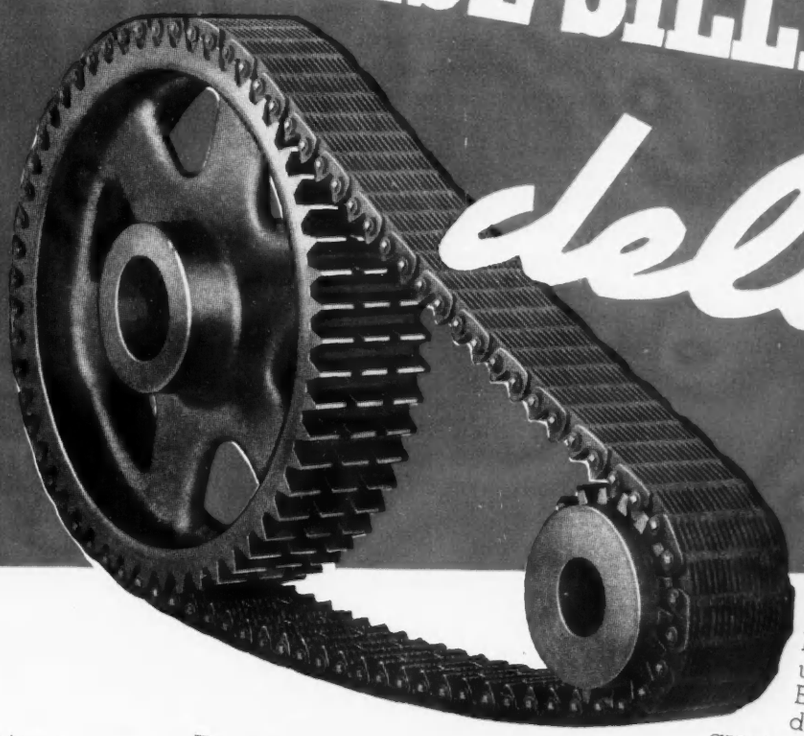

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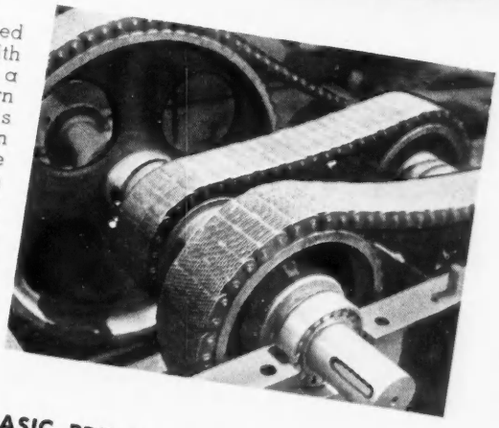

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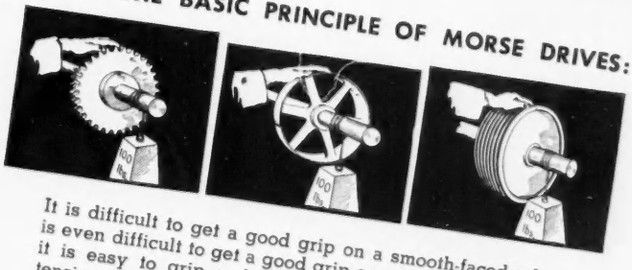

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ground level except at such points where sandstone boulders had been placed. At these points the break followed the rock margins at a distance of one-half inch to more than an inch away from the rock margins. It was found that in this zone the concrete was extremely soft but that cement had accumulated upon the rock surfaces.

In contemplation of the use of sandstone in concrete foundations it should be remembered that this rock may range from almost imperviousness to more than 25 percent in pore space and that a considerable amount of water can be absorbed by it from the slurry. This water, as it penetrates the pore spaces, carries with it cement that is needed to give the proper richness to the concrete adjacent to such boulders. The use of sandstone in foundations carrying oil field equipment, especially if such foundations are to be subjected to tensional or torsional loads, is not recommended. However, when such a practice is resorted to, the sandstone pores should be water soaked to prevent thieving of water from the slurry. When limestone is used its surface should be carefully wetted. In no case should rocks of a size abnormally larger than the average for the mix be placed at or near ground level if the foundation is to be subjected to tension or torsion.

At the installation mentioned heretofore, the gear box had been set over the foundation bolts on wood blocks, leveled and grouted in. At each point where a wood block had been placed a large crack had developed outward to the surface of the foundation. This, of course, was due to expansion of the blocks as they absorbed water. It is believed that where equipment of the type mentioned in the preceeding paragraph is to be set that but little if any economy is effected by the use of concrete materials other than good cement, sharp sand, the proper aggregate and reinforcing steel. These, of course, should be thoroughly mixed with the proper water-cement ratio, carefully "puddled" and allowed the proper setting time before loads are applied. A considerable amount of dependable data are available in regard to design of concrete mixtures to obtain desired strength.

Planning of Layout

Many of the errors which develop as a construction job progresses can be traced directly to improper planning of an installation before actual construction work is begun. This lack of preliminary study most likely will result in improper location of power units, by selection of grade levels that do not fit well into the installation as a whole and by errors in alignment. Many producers, both large and small, obtain as much production as possible during the flowing stage and it is a common weakness to forestall the purchase of pumping equipment until the last barrel of oil that can be flowed is in the tanks. Due to this hesitancy to prepare for artificial lift before the flowing stage has passed, many operators are inclined to rush the contractor or manufacturer's engineer. It is believed that a competent engineer, with one or two helpers, can efficiently lay out the average oil field installation in one day at least to the extent that work can progress smoothly and with a minimum chance of mistakes that may subsequently cause expensive delays.

Too much cannot be said regarding the importance of proper alignment of surface pumping equipment. In equipment of more recent design, engineers have given considerable thought to self-aligning bearings and other self-aligning features which incorporate a high degree of flexibility. Despite these provisions, many cases can be found where unnecessary stresses are being imposed on members of units or entire units, and this unnecessary deflection is promoting early fatigue and abnormal bearing wear. This is particularly true in the case of multiple-well installations such as central bandwheel or geared powers and stroke post or backside assemblies. In the first place, too much care cannot be exercised in selection of the point at which the prime mover or central power unit is to be placed. When this point is selected the engineer then should see that any topographic irregularities that must be overcome are considered when establishing elevation of the power equipment. In the case of bandwheel powers or central geared powers a comprehensive study should be made of the wells that are to be pumped. The condition that likely will obtain in each well should be determined. This involves a study of tubing sizes, types and sizes of pumps to be

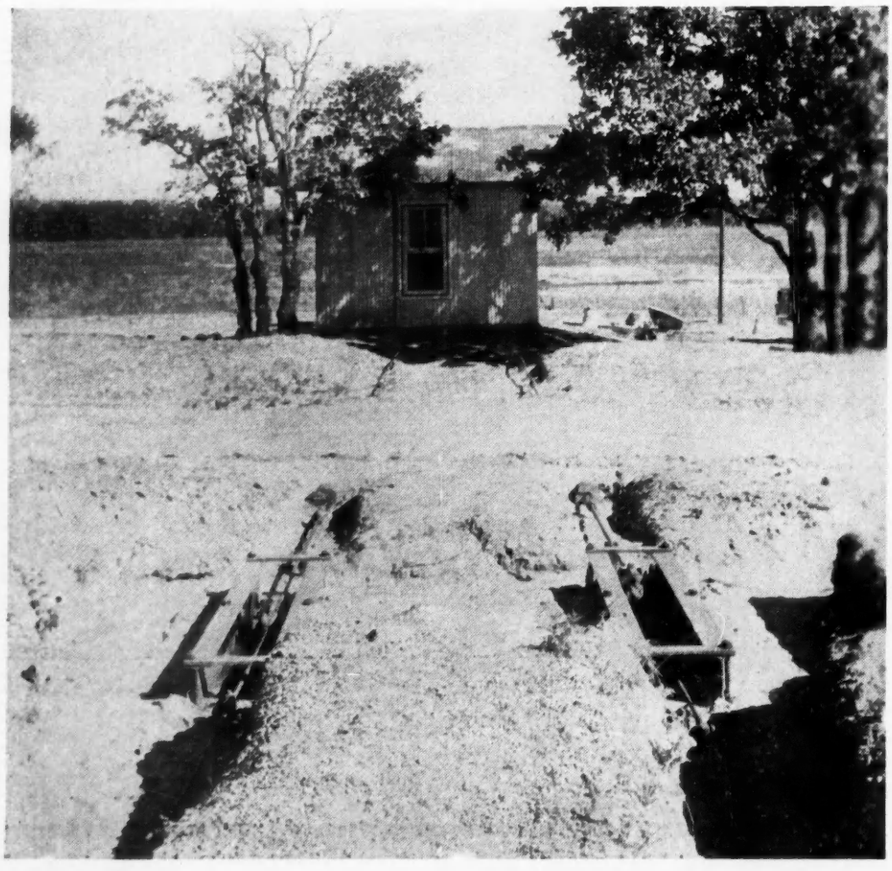

FIGURE 1

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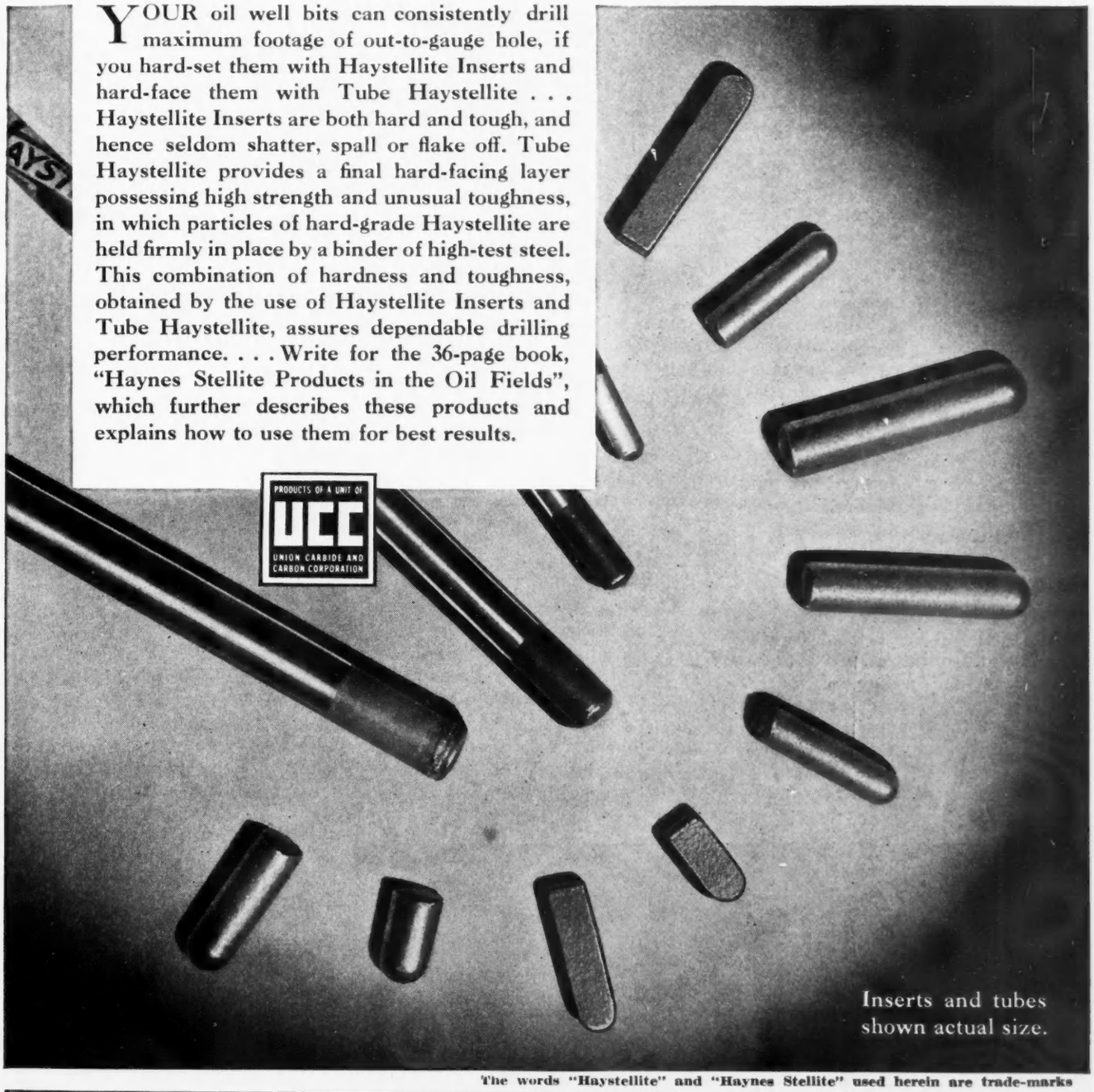
YOUR oil well bits can consistently drill maximum footage of out-to-gauge hole, if you hard-set them with Haystellite Inserts and hard-face them with Tube Haystellite . . . Haystellite Inserts are both hard and tough, and hence seldom shatter, spall or flake off. Tube Haystellite provides a final hard-facing layer possessing high strength and unusual toughness, in which particles of hard-grade Haystellite are held firmly in place by a binder of high-test steel. This combination of hardness and toughness, obtained by the use of Haystellite Inserts and Tube Haystellite, assures dependable drilling performance. . . . Write for the 36-page book, "Haynes Stellite Products in the Oil Fields", which further describes these products and explains how to use them for best results.



Inserts and tubes shown actual size.

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Haynes Stellite Welding Rods and information on other Haynes Stellite Products also are available through the 46 apparatus shipping points of The Linde Air Products Company

Visit the Haynes Stellite Exhibit, Area D-45, Western Metal Exposition, Pan Pacific Auditorium, Los Angeles, California — March 21-25

FIGURE 2

used, well depths, probable amounts of oil and water to be handled and other factors from which the probable ultimate polished rod loads can be calculated. After this information is available, the power should then be located as centrally as possible, not as regards lease boundaries but as to center as indicated by a load diagram. In this way loads on the eccentrics and on the powers as a whole can be balanced to a very satisfactory degree with a minimum use of rod line power balances. Topographic conditions may preclude the selection of a power site based on this practice but usually a location can be selected that is a compromise between conflicting conditions.

Figure 1 is an example of improper planning of elevation in connection with the installation of a four-well, double counterbalanced stroke post assembly wherein four wells are being pumped by one prime mover. In this case two wells on one side of the engine house are located on a sharply sloping hill which terminates into a topographic terrace upon which the power is located. Since one rod line had to be run through the engine foundation by use of a conduit and the planning engineer elected to run the other rod line through the engine house floor, both rod lines had to come out of the stroke posts on a horizontal plane to the foot of the hill. In order to clear an adjacent roadway and maintain this required elevation it became necessary to use the roller-type hold-downs as shown below the ground level. Here the pumper must keep this equipment clear of silt which washes down the hillside during each rainfall and any negligence on his part may result in serious damage to a type of equipment which normally requires a very minimum amount of care. By turning the prime mover around 180 degrees from its present position, one rod line could have been made to clear the engine house and eliminated this problem with the one rod line. By a slight change of elevation of the power unit both problems could have been eliminated. The same objective might have been attained by the selection of a slightly different location for the power unit.

Figure 2 is an example of the improper setting of a hold-over. This piece of equipment was installed on a sharply sloping hillside with the hold-over post in a vertical position so that unnecessary strains are being imposed both on the main and pull rod bearings. A simple analysis of this condition shows that had the post been slanted downhill properly, the hold-over pendulum would have been made to travel in the plane parallel to the slope of the hill. Figure 3 is an example of a swing which has been set to conform to the slope of a hillside to give perfect alignment between the plane of the rod line and swing bearings.

The attitude herein has been to enumerate some of the problems connected with the selection of proper equipment and its installation, to point out some of the practices which may be applied to gain more efficiency and to encourage a better understanding between producers and those who install equipment. Anything of critical nature should be interpreted as constructive in its intent.

FIGURE 3

The

5000 POUND TEST

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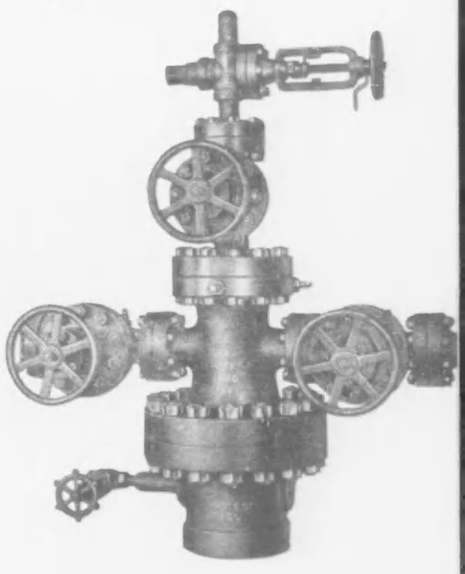
ALL-PURPOSE CROSS TYPE CONTROL CHOKE

TOPS IN PERFORMANCE ON ANY XMAS TREE



DESIGNED especially for EVERY condition of oil field service and EVERY design of hookup, the new Kerotest Cross Type Control Chokes offer you a new measure of all-service versatility in accurate flow control on pro-rated wells or for controlling back pressures to eliminate sand cutting on sand producing wells.

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Moreover, the strong, all-steel design, the accurate control, simplicity and ease of dismantling all combine to assure an economy and continuity of service that will satisfy the most exacting demands throughout the oil fields.

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HANDY WORK SHEET FOR

Income Tax Computations

THE Mid-Continent oil states seem to be the one industrial area in the country most severely afflicted with interlocking income taxes. The legislatures of these states, each acting as though none of the others or the federal government existed, have made the resort to higher mathematics necessary in computing tax liabilities where state taxes are deductible in computing federal taxes, and federal taxes are deductible in computing state taxes. Now that so many drilling contractors and supply dealers are entering the oil business via the oil-payment route, they find that large parts of their incomes originate in states having just such lunatic provisions. Even though such taxpayers may have their places of business in Texas, which is thus far mercifully free from a state income tax, all the surrounding states accord the doubtful privilege of deducting the current year's federal tax in determining the state tax.

For conditions in which the taxpayer is liable for federal excess profits tax and surtax on undistributed profits, this problem becomes a real poser, especially if more than one state income tax has to be paid. There are a great many corporations

Work Sheet for Computing Federal Normal Tax and State Income Taxes of All or Any of Mid-Continent Oil States, Where Excess Profits Tax and Surtax on Undistributed Profits Are Not Involved

(Bold figures indicate example worked out for user)

	Net Income Before Income Taxes	IF FEDERAL NET INCOME FOR NORMAL TAX IS[1]							
		$2,000 or Less		$2,000.01 to $15,000		$15,000.01 to $40,000		More than $40,000	
		Factor	Extension	Factor	Extension	Factor	Extension	Factor	Extension
FEDERAL TAX:									
Federal	**$35,000.00**	x .08		.11		.13	**$4550.00**	.15	
If taxable net income in La.[3]			9.60		13.20		*15.60		18.00
If taxable net income in N. M.[3]			1.60		2.20		2.60		3.00
Total							**$4,552.60**		
Less:									
Arkansas	**$**	x .0016		.0022		.0026		.003	
Kansas	**$10,000.00**	x .0016		.0022		.0026	**26.00**	.003	
Louisiana (spec. exemp. $3,000)[2]	**$**	x .0032		.0044		.0052		.006	
New Mexico (spec. exemp. $1,000)[2]	**$15,000.00**	x .0016		.0022		.0026	**39.00**	.003	
Oklahoma	**$20,000.00**	x .0045283		.00622641		.00733585	**146.72**	.00849057	
					60.00		360.00		1,160.00
							571.72		
							3,980.88		
LINE A	**Decimal Fraction of Federal Tax Deductible**		1.00000000		1.00000000		1.00000000		1.00000000
Less:									
Arkansas	0.	x .0016	0.	.0022	0.	.0026	0.	.003	0.
Kansas	**0.222222**	x .0016	0.	.0022	0.	.0026	**0.00057778**	.003	0.
Louisiana	0.	x .0032	0.	.0044	0.	.0052	0.	.006	0.
New Mexico	**0.333333**	x .0016	0.	.0022	0.	.0026	**0.00086667**	.003	0.
Oklahoma	**0.444444**	x .0045283	0.	.00622641	0.	.00733585	**0.00326037**	.008490570	0.
							.00470482		
LINE B							**.99529518**		

FEDERAL TAX = Line A / Line B = **3,980.88** / **.99529518** = **3,999.70**

[1] It can generally be readily determined by inspection, into which bracket the Federal tax will fall. However, if the Federal net income before taxes is close to a lower bracket limit, the State taxes, when computed, may or may not throw the federal taxable net income into the bracket below. In this event, the results obtained from the first trial will fail to "prove." Try again, using the column of factors indicated by the first attempt as the correct one.

[2] If the net income, before deducting income taxes, for either of these states is in excess of the specific exemption, enter here the full amount. If not in excess of the specific exemption, strike all quantities pertaining to that state. In some few cases, the deduction of the state share of the federal tax will cause the net income to fall below the specific exemption. A second trial will yield correct results if those of the first trial fall to "prove."

[3] Strike this line if no income earned in this state.

*Applies only to Louisiana, thus not used in example worked out.

	ARKANSAS		KANSAS		LOUISIANA		NEW MEXICO		OKLAHOMA	
STATE TAXES:										
State net income before taxes		$		**$10,000.00**		$		**$15,000.00**		**$20,000.00**
Federal tax (from above)	$		**$3,999.70**		$		**$3,999.70**		**$3,999.70**	
Decimal fraction for each state	0.		**0.222222**		0.		**0.333333**		**0 444444**	
Extension—Appropriate portion of Federal Tax deductible		$		**$888.82**		$		**$1,333.23**		**$1,777 64**
Final adjusted state net income				**9,111.18**				**13,666.77**		**18,222.36**
Less—Specific exemptions						3,000.00		1,000.00		
Net taxable income		$		**$9,111.18**		$		**$12,666.77**		**$18,222.36**
Effective state rate	.02		.02		.04		.02		.05660377	
Amount of state tax		$		**$182.22**		$		**$253.34**		**$1,031.45**

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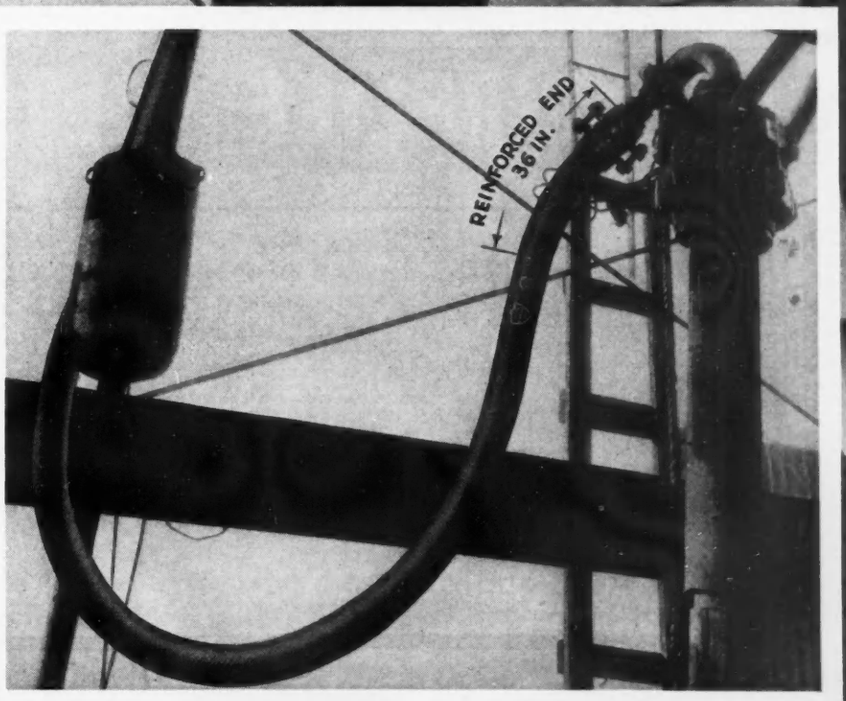

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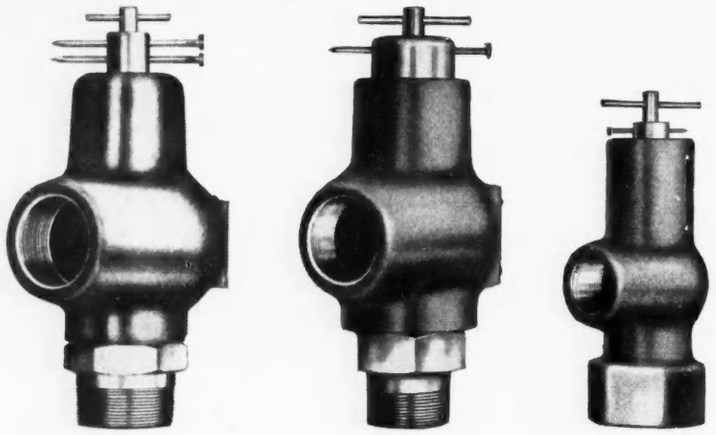

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1 3" High Pressure special 2-nail type for largest slush pumps, where exceptional through-flow capacity is required.

2 2" High Pressure type, standard for slush pumps up to 18" and 20" stroke.

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When pump pressure against the SHEAR-RELIEF Valve Piston reaches the shearing stress of the nail, the nail shears and pressure is released. The piston moves instantly through the valve body, against a soft cushion ring in the bonnet, entirely out of the way of released flow of fluid. Therefore, the sheared nail is the only damaged part . . . and another nail is all that is required to quickly reset the SHEAR-RELIEF Valve. In this manner, pump owners everywhere are protecting expensive pumps and pump parts . . . at the cost of a common nail.

See Page 71, your 1938 Composite Catalog, or write for full details.

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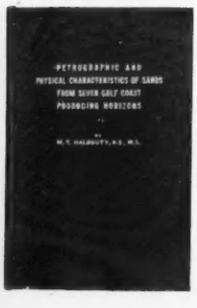
SHEAR-RELIEF VALVE



PETROGRAPHIC AND PHYSICAL CHARACTERISTICS OF SANDS FROM SEVEN GULF COAST PRODUCING HORIZONS
By M. T. Halbouty, B.S., M.S.,
Merit Oil Corp.

The material printed in this book was first published in The OIL WEEKLY in a number of installments, extending over a seven-week period. Because of the widespread interest and demand for copies, it is being presented in book form for the benefit of those who may wish to study or continue the research work of M. T. Halbouty, the author.

Size 5½" x 8¼" — Fabrikoid Binding.
126 Pages Illustrated. **Price $1.50**

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however, not in this enviable position. They find themselves liable only for federal normal tax and such state taxes as may have been incurred by the scope of their oil operations. The sample work sheet submitted has been developed for the use of such taxpayers. Tear it out, hand it to your accountant or tax adviser, and if your conditions fit, it will save him much worry and time, and you some little money.

There is worked out, by way of example, the case of a corporation having a preliminary net income for federal normal tax purposes of $35,000, and no liability for either excess profits taxes or surtax on undistributed profits. Of its total income, part was earned in Kansas, part in New Mexico and part in Oklahoma, so that income taxes in these three states must be computed. The preliminary net incomes in each state, before deducting either state or federal income taxes, were

Kansas	$10,000	.22222222
New Mexico	15,000	.33333333
Oklahoma ..	20,000	.44444445
	$45,000	1.00000000

The second column above shows the decimal fraction of the total federal tax which can be deducted for the determination of each state's tax liability. Since the federal net income is between $15,000 and $40,000 the foregoing basic figures are extended by the factors in the column for that range. As there is no Louisiana income all references to that state contained in the printed form are to be stricken. Similarly with respect to Arkansas. By the use of this simple and easily mastered form the amount of federal tax for this hypothetical company is found to be $3,999.70, and the state taxes, all of which are included as deductions from income in the federal tax computation, are found to be

Kansas	$ 182.22
New Mexico	253.34
Oklahoma	1,031.45

Algebraic equations for solving the more complicated problems that are occasioned by this situation can be constructed if one has a natural curiosity in that direction, but as a practical matter they are so cumbersome and hard to handle that it is better to forget about the reason why, and just go ahead and "bull" the answer. Substantial accuracy can be attained in a few trials, or resort can be had to tables published by the commercial tax services, for making this problem easier.

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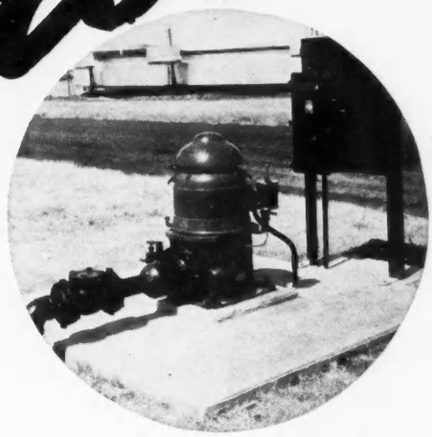

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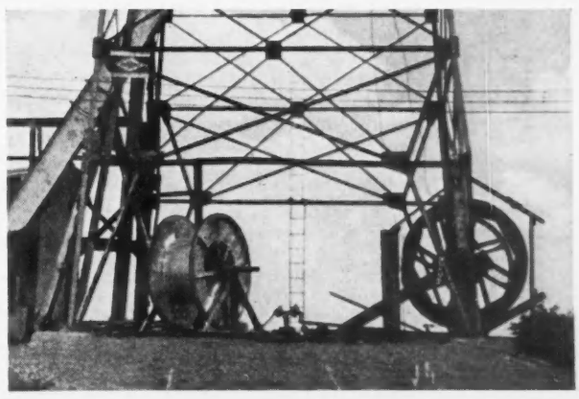

Here are several of the many ways which operators are using Purchased Electric Power to increase production efficiency and at the same time lower costs. Refiners, drillers and pipe line operators, too, find electrically powered equipment profitable.

PETROLEUM ELECTRIC POWER CLUB

MEN IN THE INDUSTRY'S NEWS

A. M. CROWELL IS APPOINTED CHIEF CONSERVATION AGENT FOR THE STATE OF ARKANSAS

FOR THE PAST FOUR YEARS HE HAS BEEN WITH THE RAILROAD COMMISSION OF TEXAS

A. M. CROWELL, gas engineer for the Texas Railroad Commission, has been named Chief Conservation Agent for the State of Arkansas, effective April 1. Crowell last week completed four years of service on the engineering staff of the Texas Railroad Commission, and resigns with the Commission as Supervisor of Field Engineering and Research.

After completing courses in the University of North Carolina, Oklahoma and Kansas, Crowell began work in the oil industry in 1926 with the Cities Service Oil Company. He has had wide experience in the Panhandle and other sections of Texas where control of gas is a major problem.

A. M. CROWELL

C. P. CHISHOLM, chief scout for Pure Oil Company, Houston, has been promoted to an assistant in the land department. He will also continue as chief scout.

T. A. MILLER, Pure Oil Company, Houston, has been transferred to the scouting department. He will relieve C. P. Chisholm of some of his duties.

DARWIN BENEDUM, geologist for M. L. Benedum Company, San Antonio, Texas, recently sailed for New York, where he will spend a few days before going to Albany to visit his brother-in-law and sister, Mr. and Mrs. Paul D. Mashburn. He will return by way of New Orleans, where he will attend the convention of the American Association of Petroleum Geologists, March 16-18.

ANGUS McLEOD, formerly chief geologist for Shell Oil Company, Los Angeles, California, has recently resigned this position to engage in consulting work. For 15 years previous to his work in California, McLeod was exploration manager for Shell Petroleum Corporation in charge of Texas, New Mexico, Louisiana and Arkansas and had direction of the work when the company had no production and only five men in his territory.

RICHARD HUGHES, for the past 10 years head of the land department and chief geologist for Burke-Greis Oil Company at Tulsa, resigned as of March 1 to become an independent. Before joining Burke-Greis, Hughes was assistant chief geologist for Mid-Continent Petroleum Corporation. Previous to that, he was in foreign service for S. Pierson & Sons.

H. H. CHAMPLIN, president of the Champlin Refining Company of Enid, Oklahoma, and one of the largest independent operators in the Mid-Continent, celebrated his seventieth birthday February 28. A bound volume containing the signatures of more than 1600 residents of Enid and the northeast part of the state was presented to him by friends.

R. H. ALEXANDER, production foreman for Magnolia Petroleum Company in Lea County, New Mexico, with headquarters at Kermit, Texas, has been promoted to superintendent of the newly created Lea district, and will establish his residence at Lovington, New Mexico.

OSCAR HATCHER, consulting geologist of Ada, Oklahoma, has been employed by the state to make a geological survey of Arizona.

NICOLAS THEODORESCO, formerly vice president of Creditul Minier, S. A., of Roumania, has been made president of that organization, succeeding N. P. Stefanescu, recently deceased. Michael Constantinescu, who has studied field conditions in the United States, is the successor of Theodoresco.

JACK E. DUCKHAM, director of Trinidad Central Oilfields, Limited, was among recent arrivals in that British colony. He sailed from London, England, early in February and expects to be away from home about two months.

TED SUNDAL, who has large holdings in the Taber field of southern Alberta, was in Calgary last week and announced that he was negotiating with other companies in the field for a program of unitized development.

"FISH" ALLEN, drilling contractor, returned to Flora, Illinois, last week following a trip to Tulsa, Dallas and other southwest oil centers.

SAMUEL MESSER, president of Quaker State Oil Refining Company, Oil City, announced that he would not be a candidate for the Democratic nomination for congress when an endorsement was formerly tendered him last week by leaders representing the six Pennsylvania counties comprising the sixth district.

COL. GEORGE A. BURRELL, wartime head of chemical research for the United States government and discoverer of helium in this country, has been named president of Atlantic States Gas Company, subsidiary of Commonwealth Gas Corporation formed to distribute liquefied gas by an underground tank system.

PAUL BLAZER, president of Ashland Oil & Refining Company, Ashland, Kentucky, discussed the oil industry of that state before the Ashland Rotary Club last week.

D. J. YOUNG, Calgary, has been named president of Command Oils, Ltd., Alberta operating company, to fill the vacancy caused by the recent death of Newton Wylie. R. G. Smith, Calgary, was named vice president, and Francis F. Reeve, Calgary, was named to fill a vacancy on the board of directors.

K. A. WALKER, scout for Skelly Oil Company at Centralia, Ilinois, has been transferred to Shreveport, Louisiana.

CARL C. ADDISON, district geologist for Pure Oil Company at Saginaw, Michigan, will head a Wolverine state delegation to the twenty-third annual meeting of the American Association of Petroleum Geologists to be held in New Orleans, Louisiana, March 16 to 18. Others from Saginaw planning to attend include Virgil R. B. Kirkham, independent operator and geologist, and B. F. Hake, of the Gulf Refining Company. Addison will present a paper on "Geology of the Buckeye Oil Field."

G. S. WILLIAMS heads a 12-man expedition which recently left Los Angeles for Jute Bay, Alaska, from which point they will go to the Aleutian range for an 11-month oil development program.

O. B. MULLINS, general manager of production for Derby Oil Company at Wichita, Kansas, for the past 2½ years, resigned March 1 to join Tom C. Johnson as supervisor of field operations. Cliff Mercer, district supervisor for the Derby company at McPherson, Kansas, has been made general production superintendent to fill the position vacated by Mullins.

E. J. NICKLOS, head of the Nicklos Drilling Company, Houston, was a visitor in Ponca City, Oklahoma, last week. He was accompanied by Mrs. Nicklos.

EARL L. REICHARD heads as president and treasurer officers of the newly organized Al Sego Oil Corporation which established offices last week in St. Louis, Michigan, and will operate in the new Allegan County field. Other officers are L. A. Giestert and Frank W. Kurtz, vice presidents; V. I. Cilley, secretary, and Kenneth B. Montigel, George D. Lindbergh and Dudley H. Waters, directors.

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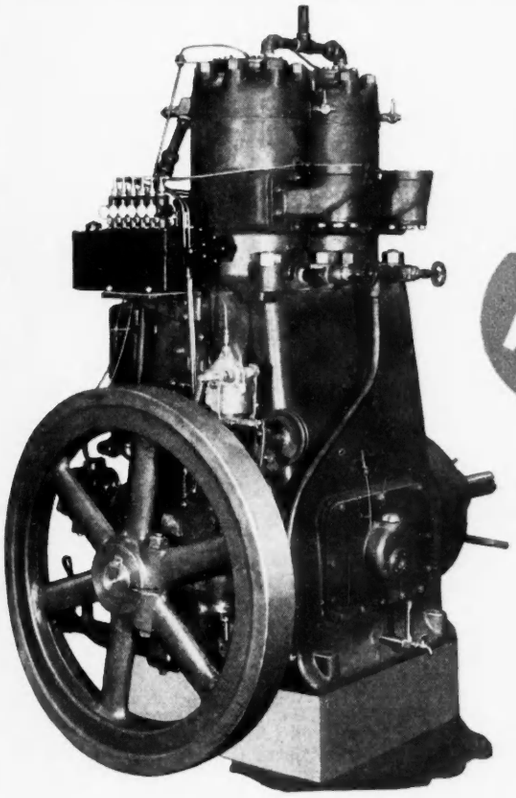
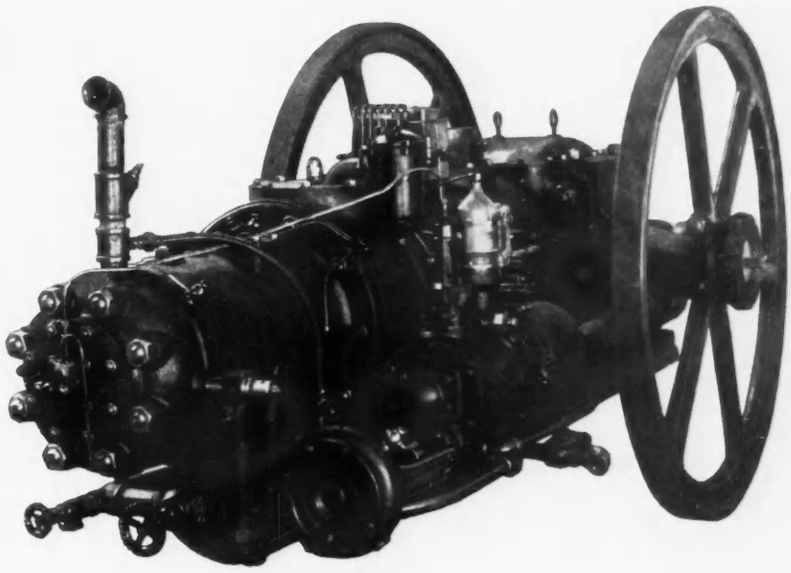


Type "V-10" twin-cylinder, two cycle, convertible oil engine, for use with standard pumping rigs or with gear-driven pumping jack.



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L. D. 59 and 116
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AND BRANCH STORES

GEORGE HILL, JR., president of Houston Oil Company, was host at an informal luncheon at the Houston Club last week at which the following were among guests: John Lovejoy and Russell McFarland of New York, president and vice president, respectively, Seaboard Oil Corporation of Delaware; A. Jacobson, New York, president, Allmand M. Blow, Tulsa, vice president and general manager, and A. Roger Denison, Tulsa, chief geologist, B. B. Weathersby, geophysicist, all of Amerada Petroleum Corporation; Craig Cullinan and James Abercrombie of Houston; Ed Salrin and J. R. Gahan, vice president and assistant vice president respectively, Tide Water Associated Oil Company, Houston; R. B. Pringle, Tide Water Oil Company, Tulsa; Messrs. Easley, International Petroleum Company; Wasson, Carile Syndicate, and Joe Wilson, Salt Dome Oil Corporation, Houston; T. J. Donohue, The Texas Company, Houston; Carl Hasselmann, Houston; Ben Belt, Gulf Oil Corporation, Houston; A. J. Galloway, in charge of Texas Gulf Coast operations for Shell Petroleum Corporation, Mr. Jago, with the same company; John R. Suman, vice president, Humble Oil & Refining Company; Ray Dudley, president of Gulf Publishing Company; Winston Henry; Ken Regan, and Adrian Moore, Houston, independent operator.

ACADEMICIAN H. E. NICOLA PARRAVANO of Italy, president of the organization committee for the Tenth International Congress for Chemistry, to be held in Rome May 19-21, reports an elaborate program has been worked out for the meeting.

JOHN LOVEJOY of New York, president of Seaboard Oil Company, was a visitor in Houston March 2.

W. J. KENNEY, chief of the oil and gas unit, the Securities and Exchange Commission, was in Tulsa last week as guest of the Mid-Continent Royalty Owners Association. Kenney discussed mutual problems of the commission and royalty men as a result of S. E. C. regulations.

HAROLD A. HALSEY, zone supervisor of Humble Oil & Refiining Company's plant at Baytown, Texas, recently has been awarded the service button, studded with two diamonds, which is presented to the company's employes having served 30 years.

JOHN B. THOMAS, legal department, Sun Oil Company, Beaumont, Texas, was a Houston visitor last week.

H. B. FUQUA, division geologist for Gulf Oil Corporation, Fort Worth, Texas, and president of American Association of Petroleum Geologists, was the principal speaker at the Houston Geological Society's weekly meeting March 3 at the Lamar Hotel. He addressed the society on matters pertaining to the association.

AXTELL J. BYLES, president of the American Petroleum Institute, New York, last week spent a day in Houston visiting oil officials. He arrived Monday from Wichita Falls, Texas, where he addressed the North Texas Oil & Gas Association.

L. W. TARKENTON, president of Quaker State Oil Company, Pampa, Texas, recently spent a week-end in Tulsa, Oklahoma.

OPTIMIST

MARVIN LEE

MARVIN LEE of Wichita, who recently resigned as technical adviser to the state corporation commission of Kansas to resume full time consulting work on geological and production problems, says he is an optimist in regard to the future of the oil business, in spite of sometimes disappointing experiences.

After getting his sheepskin from Western Kentucky State Normal, Lee taught school, quitting to begin geological work in 1911. From then until the native Kentuckian became chairman of the oil advisary committee to the public service commission of Kansas in 1931, he engaged in consulting work in the central and southwestern portion of the United States.

A past vice president of the American Association of Petroleum Geologists, past president of the Kansas Geological Society and a director in the Independent Petroleum Association of America, Lee has been active in state and national affairs of the oil industry for a number of years.

H. E. STAPPER of New York, head of Stapper Petroleum Company of Corpus Christi, Texas, was a recent Houston visitor.

CARL L. MAYER recently resigned as president of Red Bank Oil Company, Houston; his resignation becomes effective April 1.

JACK CONNELLY, geologist for Amerada Petroleum Company at Shawnee, Oklahome, has been transferred to Corpus Christi, Texas.

K. A. WALKER, scout for Skelly Oil Company, Centralia, Illinois, has been transferred to Shreveport, Louisiana.

ROBERT ROBSON has recently been added to Skelly Oil Company's scouting department at Tulsa, succeeding Joe Bicking, who was transferred to Wichita, Kansas.

JOHN McKAY, engaged in exploration work for Imperial Oil Company, Ltd., in South America for the past 12 years, is now stationed in the Turner Valley field of Alberta, Canada, where he is with the Royalite Oil Company, Ltd., Imperial subsidiary.

H. L. RAU, Carter Oil Company, discussed the Keokuk pool of northern Seminole County, Oklahoma, last week before members of the Shawnee Geological Society.

DR. ROBERT T. HILL, veteran Texas geologist and an authority on the physical geology of the state, has been appointed a lecturer in the department of geology at Southern Methodist University, Dallas. He served the United States Geological Survey about 30 years, and has carried on extensive geological research in California and Arkansas.

L. E. BREDBERG, Fort Worth operator and former oil writer, has completed a cruise to the West Indies and is visiting points in the East before returning to Texas to drill prospective acreage in Jones County.

G. S. INNIS has been placed in charge of field operations in the Jefferson area, Marion County, Texas, by Fohs Oil Company, succeeding R. G. Dobbs, transferred to Houma, Louisiana. Robert Briggs of the same company has been transferred from Jefferson to El Dorado, Arkansas.

J. L. LUCAS has organized Sacultrab Oil Corporation of San Antonio and has established offices at 507 Brady building. The concern already has holdings in Guadalupe County and during the week closed a deal for 700 acres of the O. F. Adams tract a half-mile southwest of the newly discovered Alfred field of Jim Wells County. Lucas is president of the concern.

MRS. KATHERINE RYAN, San Antonio independent operator, was a New Orleans visitor during the week. Mrs. Ryan has staked two locations for wells to be drilled in the Oilton pool of Webb County.

JOHN ARMSTRONG, Armoil Production Company, San Antonio, visited Houston during the week.

PAUL B. DUHOUX, geologist of Kilomoto, Belgium Kongo, arrived in Houston last week for a short visit. He intends to attend the annual convention of the American Association of Petroleum Geologists at New Orleans, Louisiana, this month.

JOE H. RUSSELL, vice president of Gulf Oil Corporation, Houston, was recently elected president for the next year of Houston's Texas Exes, succeeding James L. Shepherd, Jr.

W. S. HERRON, president, headed the list of directors of Okalta Oils, Ltd., pioneer Alberta operating company, reelected when shareholders held their annual meeting at Calgary last week. Others named are L. H. Fenerty, R. W. Ward, H. K. Reed and Robert Wilkinson. Mr. Herron predicted that 42 wells would be drilling on the company's Turner Valley acreage by the end of 1939.

EDGAR H. STAPPER, New York, president of Stapper Petroleum Company, has completed a tour of South Texas and the Gulf Coast, having been in San Antonio, Corpus Christi and Houston.

THORNTON DAVIS, Peerless Oil & Gas Company, San Antonio, visited in Houston last week.

L. A. "RED" CRUMP, Corpus Christi, superintendent for C. Andrade III interests, was a visitor to Houston during the week.

RAY F. SCHOOLFIELD, San Antonio, member of Duval Oil Corporation, is in New Orleans on business.

DIED:

HARRY R. KIVEL, superintendent of The Gulf Publishing Company's printing department since 1922, died in a Houston hospital early Wednesday, March 2, and was buried March 4. A native of Illinois, he first came to Houston for war training with the Illinois troops with whom he went to France where he advanced from the ranks to second lieutenant. He was prominent in local amateur sports. Survivors include his widow, two daughters and a son.

IRVIN N. CLAY, 60, secretary of Wyoming Associated Oil Company and active recently in pushing development of the Shawnee structure east of Douglas, Wyoming, died in a Denver hospital February 27 following an illness of six months. He was taken to Denver for treatment after being struck down August 30 by a truck in the downtown business section of Casper, where he made his home. Surviving are a sister and two nephews. He never married.

A. C. EBIE, 74, who retired in 1928 as vice president and general manager of Magnolia Petroleum Company, died February 26 at his home in Dallas, after an illness of three years. He was with several branches of Standard Oil Company in the East before coming to Dallas in 1911 to join the Magnolia company. Survivors include two brothers and two sisters.

W. R. "TEX" JONES, 52, operator in Texas and Kansas fields, died in a Wichita, Kansas, hospital February 26 of a heart attack after an illness of three weeks. Before entering the oil business, he was active in professional baseball, playing with Western League and International Baseball League teams and the Chicago White Sox. Surviving are his widow, three daughters, a son, three grandchildren and two brothers.

JOSEPH FRANCIS MOODY, 55, inventor of oil field equipment and connected with Walter O'Bannon Company, died at his home in Tulsa February 22 of pneumonia and heart disease after an illness of three months. Surviving are his widow, one son, a daughter, four brothers and three sisters.

ASSOCIATION ACTIVITIES

Geophysicists to hold meeting at New Orleans March 15-17

The Society of Exploration Geophysicists will hold its annual meeting at New Orleans, Louisiana, March 15-17, with headquarters at the Roosevelt hotel. The tentative program has been outlined as follows:

Tuesday, March 15, 8:00 a.m., meeting of nominating and executive committees; 9:00 a.m., registration; 10:00 a.m., technical session, University room; 12:15 p.m., luncheon, Blue room; 2:00 p.m., technical session, University room; 8:00 p.m., banquet, Grand ball room.

Wednesday, March 16, 10:00 a.m., technical session, University room; 2:00 p.m., technical session, University room.

Thursday, March 17, 9:00 a.m., joint meeting with A.A.P.G., at which two papers from the society's program will be presented by special request, as being of like interest to both organizations.

A partial list of papers to be presented at the above sessions includes the following:

Beers, Roland F., Geotechnical Corporation, Dallas, "A Problem in Seismic Depth Calculation."

Cloud, Raymond T., Western Geophysical Company, Los Angeles, "The Energy and Amplitude of Reflected Seismic Waves."

Deussen, Alexander, consulting geologist, Houston, Texas, "Discoveries." (Joint meeting, March 17.)

Eckhardt, E. A., Gulf Research & Development Corporation, Pittsburgh, "Gravity Difference Benchmarks for Gravimeter Calibration and Control Thereof."

Evjen, H. M., Shell Corporation, Houston, "Depth Factors and Resolving Power of Electrical Measurements."

Green, Cecil H., with T. N. Walsh and Barney Fisher, Geophysical Service, Inc., Dallas, "Velocity-Depth Determinations from Velocity Profiles."

Hawley, Paul F., Western Geophysical Company, Los Angeles, "Transients in Electrical Prospecting."

Johnson, Curtis H., Rieber Laboratory, Los Angeles, "Steady State Polar Sensitivity Curves."

Karcher, J. C., Geophysical Service, Inc., Dallas, "Review of the Relation Between Physics and Geology." (Joint meeting, March 17.)

Kelly, Dunford, Western Geophysical Company, Los Angeles, "A Reaction Type Steady State Shaking Table."

Klaus, H., Klaus Exploration Company, Enid, Oklahoma, "An Introduction to the Second Derivative Contour Method of Interpreting Torsion Balance Data."

Lawlor, Reed, Rieber Laboratory, Los Angeles, "Chart for Dip Computations."

McGhee, Geo. C., National Geophysical Company, Dallas, "A Seismic Survey in the South of England."

Mott-Smith, Morton, Independent Exploration Company, Houston, "On Seismic Paths and Velocity-Time Relations."

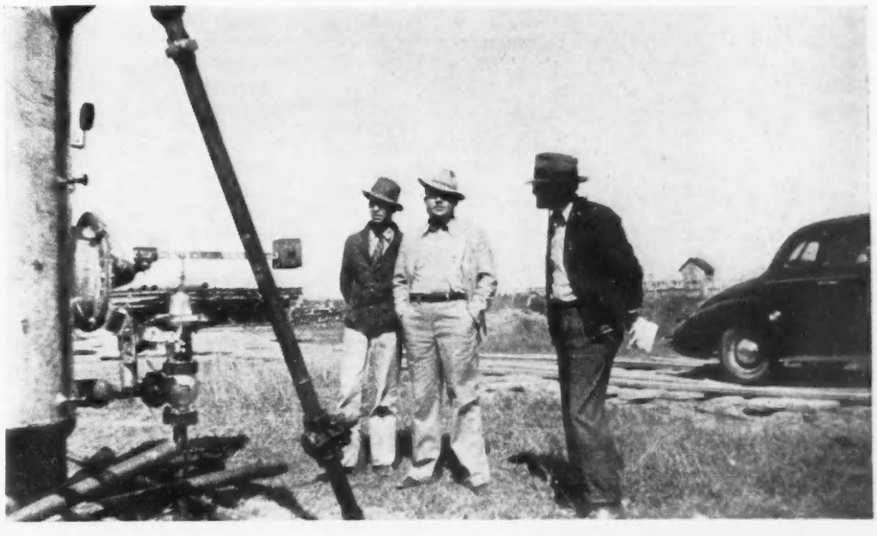
Murray, G. H., with M. Martin, and W. J. Gillingham, Schlumberger Well Surveying Corporation, Houston, "Determination of Potential Productivity of Oil-Bearing Formations by Resistivity Measurements."

Mitera, Z. A., consulting geophysicist, Lwow, Poland, "Present Status and Future Aspects of Geophysical Prospecting in Poland."

Muskat, Morris, Gulf Research & Development Corporation, Pittsburgh, "The Reflection of Longitudinal Wave Pulses from Plane Parallel Plates."

Rock, S. M., Rieber Laboratory, Los Angeles, "Three Dimensional Reflection Control."

Rosaire, E. E., Subterrex, Houston,



G. I. Harris, Lease Operator at the left; W. G. Sinclair, Superintendent for the Nadel interests in the center, with O. D. Bryan, State Corporation Commission Gauger at the right, following a routine inspection. The snap was made during a visit to Nadel properties in the Burrton field of Reno County, Kansas.

"Shallow Stratigraphic Variations over Gulf Coast Structures."

Silverman, Daniel, Western Geophysical Company, Los Angeles, "The Steady State Response of Electro-magnetically-damped Dynamic and Reluctance Type Seismometers."

Sparks, Neil R., and Paul F. Hawley, Western Geophysical Company, Los Angeles, "Maximum Electromagnetic Damping of a Reluctance Seismometer."

West, S. S., Subterrex, Houston, "Electrical Prospecting with Non-sinusoidal Alternating Currents."

Oil at Capitols

[*Continued on page 13*]

by Commissioner Fred W. Johnson, of the general land office.

The property includes 99.77 acres in the Carterville-Sarepta area, 28.93 acres in the Rodessa field, and 27.96 acres in Unit No. 4 of the same development.

Successful bidders for the leases will be required to deposit one-fifth of the amount of each bid on the day of the sale, as well as establish their qualifications to receive a lease from the government under the law. The remaining four-fifths of the bid, together with annual rental in advance of $1 per acre, must be paid prior to the issuance of the lease.

In addition to the annual rental fee, the government will receive royalties from the production of gas and oil on the land, based on a percentage of the return.

On October 18, last, a bid by Standard Oil Company of Louisiana for Unit No. 4 was refused by the government on the ground that it was too low, when compared with the productive value of land adjacent to the tract.

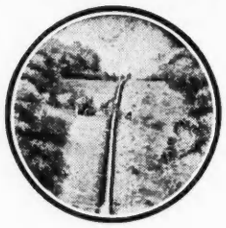
According to information reaching the department, Unit No. 4 is now subject to drainage of the oil and gas by developments now being carried on in the vicinity. Two wells in the same section adjoining the government tract, which were drilled to a depth of more than 6000 feet, are producing daily 1150 barrels and 1730 barrels of oil respectively, and are connected to the Texas Refining Company's pipe lines. Wells are also producing on adjoining sections.

Canadian tariff reduction asked of parliament

The Canadian parliament was asked to effect a drastic reduction in tariffs on all necessities of life and to remove all duties on instruments of production, including crude oil, in a resolution adopted unanimously last week by the Saskatchewan legislature at Regina.

GUY G. BOGGESS, Spencer, and P. G. Meador and Sam Sleman, both of Charleston, last week organized Boggess Drilling Company to operate in Roane, Calhoun, Jackson and Kanawha Counties, West Virginia. Offices will be maintained in Charleston.

PIPE LINE NEWS



Phillips buys Barnsdall Seminole pipe line

Phillips Petroleum Company at Bartlesville, Oklahoma, has purchased the 48-mile 6-inch pipe line of Barnsdall Refining Corporation extending from the Seminole field of Seminole County to the refinery at Okmulgee. Phillips is taking up its own 4-inch line from the field to be used elsewhere. Financial consideration was not learned.

Seek approval for Michigan gas line

Five independent Michigan gas operators, claiming to represent 40 percent of the state's total gas production or an open flow of 2,000,000,000 cubic feet a day, sought approval of the Michigan public utilities commission last week of a proposal to construct and operate natural gas transmission lines through 10 state cities. The project, for which RFC funds would be sought, would cost from $2,500,000 to $3,000,000.

Incorporators of the firm, to be known as Producers' Natural Gas Pipeline Company, are R. A. Whitehead, Lansing; Roy T. Ide, Guy M. Obenhauer and Edward J. Lieber, all of Detroit, and Paul B. Whitney, Grand Rapids.

The company, Whitehead said, would pipe gas from Mecosta, Isabella, Montcalm, Gratiot, Shiawassee, Livingston, Wayne, Allegan and Clinton fields and the line would be laid from Montcalm and Mecosta counties, southeast to the cities of Owosso, Flint and Pontiac, from Montcalm and Mecosta south to Greenville, Belding and Battle Creek, from Battle Creek west to Kalamazoo and east to Jackson and Ann Arbor. The company proposes later to supply the cities of Monroe, Adrian, Hillsdale, Coldwater, Sturgis, Benton Harbor and St. Joseph, "and to construct, operate and maintain a pipe line southward of the city of Hillsdale or the vicinity thereof to the boundary of Ohio and to such other cities, villages, localities, institutions and communities as are situated or located within a reasonable adjacent area to the proposed lines."

Bell buys Continental Burkburnett system

Tulsa—Bell Oil & Gas Company last week purchased the gathering system of Continental Oil Company in the Burkburnett area, as well as the main pipe line from that area to Wichita Falls in north Texas. The company also purchased 81 wells, producing from shallow pay in the sector. The line is to tie in with the present line extending over the line into Oklahoma and will run to the company refinery at Grandfield, Oklahoma. The company now has 450 miles of pipe line system in the area, making it the leading buyer there.

Evaluations fixed

Valuations as of December 31, 1934, for property of three pipe line companies owned and used for common carrier purposes were fixed last week by the Interstate Commerce Commission. They are: Spartan Refining Company, operating in Arkansas and Louisiana, $750,000; Atlas Pipe Line Company, operating in Texas and Louisiana, $400,000, and International Pipe Line, operating in Montana, $325,000.

Propose Canadian line as defense measure

Construction of a pipe line from the Turner Valley field of Alberta, Canada, to the head of navigation at Fort William was suggested as a unit in a program of national defense by Walter S. Campbell, Calgary, president of the Petroleum Producers' Association, on his arrival in Montreal last week. The pipe line, which would cost about $15,000,000 or about half the price of a first-class battleship, would provide Canada with a protected avenue of supply of crude oil to vessels in Eastern Canadian waters.

Expect Wider Markets

Turner Valley operators are currently held to proration at 42 percent of potential because of limited marketing facilities. The Dominion tariff board is conducting an inquiry which producers hope will result in wider markets for crude produced in the rapidly growing field.

"We sincerely hope the business of transportation from Turner Valley district will be handled by Canadian railways, but if not it will be handled by pipe line," Campbell said. He pointed out that Canadians have already spent $15,000,000 trying to find oil, and with its discovery and developmnet of production, the next problem was to find markets and get the oil to them. Empire companies have made definite offers to Turner Valley operators, but movement of West Canadian crude to England hinges on solution of the freight problem between the field and a port. Campbell said that geologists had estimated the potential reserve of the Turner Valley field at the end of 1937 at 500,000,000 barrels.

Continues Steady

Some improvement in statistics while prices are holding firm in all departments; control methods slowing gasoline stock accumulation.

THE markets of the oil industry are retaining the firmness gained during the past several weeks, and current prices are generally the same as a week ago, from well to service station.

The continuing steadiness of the markets undoubtedly is due, in large measure, to the exceptionally effective balancing of well and refinery output with market demand.

Both crude oil production and refinery operations currently are being held down with unusual strictness. And this control is having a stabilizing effect on the markets for both crude and refined oils.

Outlook Hopeful

Moreover, the immediate outlook is quite hopeful, inasmuch as the leading oil producing states plan to extend unusually strict control of production through March. Texas will continue the Sunday shut-down of all fields in the state during March, as it did in recent weeks. Oklahoma has adopted, for March, a daily allowable for the state of 475,000 barrels daily, or almost 75,000 barrels a day less than the indicated market demand as estimated by the Bureau of Mines.

Louisiana's March allowable is only 5000 barrels a day above the estimated demand.

The crude oil market, in the Mid-Continent, lately has been reflecting the desire of most purchasers to hold down their takings strictly within their market requirements. But the present exceptionally strict allowables have furnished the stabilizing influence needed.

Statistics Better

The latest statistics of the petroleum industry indicated some improvement of conditions in the industry.

The recent trend of crude oil production has been especially encouraging. In the week ended February 26, production in the United States declined 46,450 barrels to the level of 3,322,800 barrels daily. That was only eight-tenths of 1 percent more than the production in the corresponding week a year ago. Yet the demand for petroleum has been running this year a little higher than last year.

Refinery Operations

In recognition of excessive inventories of gasoline, fuel oil, and some other products, the industry has curtailed refinery operations to moderate proportions. Crude oil runs to stills in the week ended February 26 averaged 3,170,000 barrels daily, or only 2.7 percent more than in the similar week of last year.

Gasoline Stocks

As generally expected, gasoline stocks in the United States again reached a new all-time peak in the week ended February 26. However, the additions to stocks during that week were not as large as those in some earlier weeks. In the seven-day period, the gasoline stocks increased only about 1,000,000 barrels, as compared with an increase of 2,000,000 barrels the preceding week. This latest increase of 1,000,000 barrels also was only half as large as the 2,000,000-barrel increase in the corresponding week of last year.

The gasoline inventories on February 26 totaled 90,719,000 barrels. That was 18.4 percent more than the supply of gasoline on hand on the comparable date a year ago. This year-to-year expansion of gasoline stocks is not justified by the trend of gasoline demand, as the requirements have been running this year only slightly higher than last year.

However, the recent slowing down of additions to gasoline storage has resulted in some improvement of the stocks situation. Thus, in former weeks, recently, the gasoline stocks were holding more than 20 percent above the levels of one year previously, but as just indicated, the present supply is only 18.4 percent larger than a year ago.

Fuel Oil Situation

Within recent weeks, the fuel oil market has been materially impaired by the building up of surplus stocks. In the week ended February 26, the fuel oil in-

Trends of United States Production and Stocks

Figures are from American Petroleum Institute weekly reports, except those on crude stocks, which are from Bureau of Mines weekly reports

WEEK ENDED	Crude Oil Production (Barrels Daily)	Crude Runs to Stills (Barrels Daily)	Crude Oil Stocks (Barrels)	Gasoline Stocks (Barrels)	Gas & Fuel Oil Stocks (Barrels)
January 2, 1937	3,121,400	3,030,000	287,659,000	62,661,000	106,330,000
January 30	3,194,050	2,995,000	285,384,000	69,540,000	102,078,000
February 27	3,296,100	3,085,000	288,121,000	78,786,000	99,534,000
March 27	3,431,300	3,060,000	293,587,000	83,538,000	96,591,000
April 24	3,496,400	3,125,000	300,737,000	82,303,000	94,100,000
May 29	3,573,000	3,245,000	306,445,000	78,758,000	96,139,000
June 26	3,529,600	3,235,000	307,679,000	75,427,000	100,395,000
July 31	3,591,900	3,425,000	308,250,000	70,872,000	108,209,000
August 29	*3,731,450	3,425,000	309,506,000	66,997,000	112,111,000
September 25	3,666,300	*3,455,000	307,974,000	65,620,000	116,472,000
October 2	3,647,450	3,400,000	309,036,000	65,266,000	117,076,000
October 30	3,602,950	3,345,000	307,140,000	66,836,000	121,070,000
November 27	3,425,800	3,325,000	304,156,000	68,544,000	121,616,000
December 25	3,492,600	3,245,000	303,294,000	74,437,000	118,659,000
January 1, 1938	3,436,600	3,320,000	303,468,000	77,291,000	118,660,000
January 29	3,357,650	3,170,000	304,286,000	84,844,000	118,793,000
February 5	3,316,450	3,155,000	304,494,000	86,484,000	118,619,000
February 12	3,324,500	3,150,000	304,915,000	87,813,000	119,293,000
February 19	3,369,250	3,150,000	305,219,000	89,774,000	119,948,000
February 26, 1938	3,322,800	3,170,000	.....	*90,719,000	120,958,000
February 27, 1937	3,296,100	3,085,000	286,158,000	76,616,000	99,176,000
Change in past year	+0.8%	+2.7%	+6.6%	+18.4%	+21.9%

* All time peak. † Stocks, February 13, 1937.

ventories were increased another 1,000,000 barrels, rising to 120,958,000 barrels. That was 21.9 percent more than the supply of fuel oil on hand one year previously.

The unusually large fuel oil inventory is having an adverse effect on fuel oil prices, although actual declines in quotations so far have been exceptional.

Crude Oil Stocks

Since production of crude oil has been closely balanced with demand lately, the stocks of crude oil have been holding largely unchanged. In the week ended February 19, the crude oil stocks increased about 300,000 barrels, rising to 305,219,000 barrels. The crude stocks now are 6.6 percent larger than one year ago. This expansion in crude stocks is not far out of line with the gain that has occurred in petroleum demand.

Refinery Prices

U. S. motor gasoline ranged in the Oklahoma market last week about as follows: 62 octane and below 4 to 4¼ cents a gallon; 63 to 66 octane, 4⅜ to 4½ cents; 67 to 69 octane, 4⅝ to 4⅞ cents; and 70 to 72 octane, 4⅞ to 5⅛ cents.

Corresponding prices in the Chicago market were as follows: 4 to 4⅛ cents, 4¼ to 4⅝ cents, 4⅝ to 4¾ cents, and 4⅝ to 5 cents.

In East Texas the most common gasoline, 60-62 400 end-point, was priced generally around 4¼ cents a gallon.

Natural gasoline, grade 26-70, was priced generally in the Mid-Continent markets, f.o.b. refineries, at 2¼ to 2⅜ cents a gallon, and sales were reported from 2⅛ to 2¼ cents f.o.b. Breckenridge, Texas.

Kerosene prices f.o.b. Oklahoma refineries ranged from 4⅛ to 4⅜ cents a gallon for the 41-43 water white grade, and from 4¼ to 4½ cents for the 43-44 water white grade. Corresponding prices in the Chicago market were 4⅛ to 4¼ cents and 4¼ to 4½ cents.

Fuel oil prices were mostly unchanged, although some grades were down ⅛ cent a gallon. In the Chicago market range oil was priced from 4 to 4¼ cents a gallon. The No. 1 white oil was priced from 4 to 4⅛ cents, and the No. 1 straw from 3⅞ to 4 cents. No. 2 straw was 3¾ to 3⅞ cents and No. 2 dark from 3½ to 3¾ cents. No. 3 oil was 3½ to 3¾ cents. No. 4 was $1.05 to $1.10 a barrel to domestic consumers and 95 cents to $1.10 to industrial buyers. No. 5 oils were 80 to 85 cents for domestic and 75 to 85 cents for industrial sales. The No. 6 oil was quoted to the usual industrial customers at 52½ to 60 cents a barrel.

CRUDE OIL PRICES

Complete tables of prices paid for crude oil at the well in principal fields is shown on page 72. This schedule will appear only in the first issue of each month.

California gas companies ordered to reduce rates

Natural gas rates of the Pacific Gas & Electric Company and its subsidiary companies were ordered reduced $2,000,000 last week by an order of the California Railroad Commission. The order affects the companies' sales in Northern and Central California and is to become effective April 1, and be retroactive to March 1.

Wallace L. Ware, president of the commission, said the state body conducted an informal investigation before deciding on the rate cuts, the purpose of which are to favor primarily the average home consumer.

Valuations as of December 31, 1934, have been fixed by the Interstate Commerce Commission on properties of Ajax Pipe Line Company and Pure Oil Pipe Line Company. The Ajax company's line, used to transport oil from the Mid-Continent to Illinois, was valued at $11,750,000, while the Pure company's line from West Virginia and Ohio to Pennsylvania was valued at $80,000.

Summary of Wells Completed in the United States Week Ending March 5, 1938

	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total, 1938	Total this Date, 1937
Alabama	....	....	....	....	.....	.....	1
Arkansas	3	2	....	1	1,420	39	10
California	17	17	....	....	26,072	207	220
Colorado	1	1	....	....	492	3	3
Florida	....	....	....	....	.....	.....	.....
Illinois	13	8	....	5	3,507	137	5
Indiana	1	....	1	....	.....	14	32
Kansas	29	16	1	12	10,771	369	359
Kentucky	13	3	5	5	9	130	40
Louisiana	17	14	....	3	5,125	210	116
Michigan	18	11	....	7	1,787	155	140
Mississippi	....	....	....	....	.....	5	5
Montana	....	....	....	....	.....	7	16
Nebraska	....	....	....	....	.....	.....	.....
New Mexico	13	11	1	1	8,310	94	121
New York	1	....	1	....	.....	14	.....
Ohio	21	6	10	5	168	187	310
Oklahoma	24	12	4	8	2,891	396	508
Pennsylvania	3	....	1	2	.....	42	17
Texas	265	184	7	74	307,505	2,370	2,416
Utah	....	....	....	....	.....	.....	.....
West Virginia	19	5	12	2	72	177	157
Wyoming	....	....	....	....	.....	13	18
Total this week	458	290	43	124	368,129	4,569	4,495
Total last week	467	326	42	99	408,903	.....	.....
Total this year	4,569	3,061	441	1,066	3,746,311	....	..

Comparison of Permits Granted for New Wells

STATE	Week Ending Mar. 5	Total this Mo.	Total this Year	Total this Date Last Year	1937 Year Total
Arkansas	3	3	43	15	240
California	29	29	230	221	1,584
Louisiana	17	17	249	160	1,227
Kansas	17	17	313	372	2,663
Michigan	10	10	100	151	958
Oklahoma	21	21	373	454	2,711
Texas	363	363	2,571	2,870	17,238
Total	460	460	3,879	4,243	26,621

Small Output Increase

Gain of only 11,735 barrels daily influenced by Oklahoma, Texas and Louisiana, while Kansas and California show declines.

THE first week in March saw a comparatively small increase in United States crude oil production, it having averaged 3,334,553 barrels a day, which was 11,735 barrels more than in the previous week and under the Bureau of Mines recommendation by 57,047 barrels daily.

Despite the reduced state allowable for Oklahoma for the month of March, output during the past week in this state rose again. The increased allowable for Texas will not materially affect present low production, as the Sunday shutdown of all producing wells will be carried through March, consequently the output during the past week remained at about the same level as in the previous week. A slight gain in production was encountered in Louisiana and a small decrease in Kansas and California.

Oklahoma output was 30,900 barrels a day higher than in the previous week, averaging 522,475 barrels daily, which was 25,225 barrels below the Bureau of Mines recommendation, but above the state allowable 47,475 barrels.

Texas production increased 1850 barrels to 1,251,350 barrels a day, which was 93,550 barrels under the indicated demand and 241,823 barrels daily below the state allowable.

Louisiana last week averaged 257,325 barrels a day, 1075 more than in the previous week, 17,925 barrels more than the estimated demand, and 13,195 barrels more than the allowable prescribed by the state.

Kansas showed a small decrease of 4275 barrels, averaging 166,875 barrels a day, which was 9825 barrels less than the Bureau of Mines recommendation and 2653 barrels less than the state allowable.

California likewise decreased its production during the past week by 20,490 barrels a day, having averaged 724,953 barrels a day. That was 30,353 barrels daily more than the Bureau of Mines estimated demand.

United States Crude Oil Production

Estimates Compiled by The OIL WEEKLY

DISTRICT OR STATE	Bureau of Mines Recommendation (Daily in Mar.)	State Allowable in March	BARRELS DAILY FOR WEEK ENDING March 5	BARRELS DAILY FOR WEEK ENDING February 26
TEXAS—				
Texas Panhandle			67,300	68,800
North Texas			63,950	64,100
West Central Texas			27,500	27,100
West Texas			178,500	177,900
East Central Texas			89,600	89,800
East Texas Field			426,100	425,500
South Texas			215,200	212,700
Texas Gulf Coast			183,200	183,600
Total Texas	1,344,900	1,493,173	1,251,350	1,249,500
CALIFORNIA—				
Long Beach			57,950	56,756
Santa Fe Springs			39,496	40,325
Huntington Beach			33,753	35,399
Dominguez			30,680	30,183
Inglewood			14,936	16,264
Ventura Avenue			37,193	37,787
Seal Beach			8,486	9,915
Midway-Sunset			74,701	73,390
Elwood			7,600	7,651
Kettleman Hills			79,519	83,183
Mountain View			12,979	13,112
Playa del Rey			7,589	7,551
Wilmington			102,228	116,230
Others			217,843	217,697
Total California	694,600		724,953	745,443
OKLAHOMA—				
Oklahoma City			124,075	101,975
Seminole Area			85,100	98,150
Crescent			6,800	7,700
Lucien			12,150	12,200
Fitts			62,475	58,275
Edmond			7,500	7,800
Moore			7,200	7,475
Others			217,175	198,000
Total Oklahoma	547,700	475,000	522,475	491,575
Louisiana—				
North Louisiana			80,025	79,550
South Louisiana			177,300	176,700
Total Louisiana	239,400	244,130	257,325	256,250
KANSAS—				
Ritz-Canton			6,200	6,175
Chase			5,525	5,725
Hollow-Nikkel			3,025	3,000
Sedgwick			3,775	3,800
Burrton-Haven			10,950	11,125
Lorraine			2,800	2,350
Russell County			29,600	28,700
Silica—West			13,975	15,200
Silica—South			1,725	2,850
Others			89,300	92,225
Total Kansas	176,700	169,528	166,875	171,150
NEW MEXICO	105,100		105,200	105,400
MICHIGAN	51,600		51,100	50,800
ARKANSAS	38,200		49,775	46,800
MOUNTAIN STATES—				
Wyoming	46,400		46,900	47,100
Montana	13,300		13,500	14,100
Colorado	4,500		4,200	4,400
Total Rocky Mountain States	64,200		64,600	65,600
EASTERN STATES—				
Pennsylvania Grade			80,500	80,100
Southern Illinois (New Pools)			27,300	27,800
Illinois-Indiana (Old Pools)			11,400	11,050
Others, Eastern			21,700	21,350
Total Eastern States	129,200		140,900	140,300
Total United States	3,391,600		3,334,553	3,322,818

Ask 20-acre spacing for White Point field

Austin. — Twenty-acre spacing for wells located in the White Point field, San Patricio County, was advocated last week before the Texas Railroad Commission.

Plymouth Oil Company has recently completed Brigham 1-A as an oil producer. The well made 219 barrels per day on a 9/64-inch choke from 5665 feet. Because there were several long, narrow strips in the field, some operators preferred spacing their wells 330 feet from lease lines and 660 feet apart, but drilling only one well on each 20-acre unit. They expresed the opinion that this program could be enforced through use of a 20-acre proration unit.

CRUDE OIL PRICE SCHEDULES

(Figures Revised to March 4, 1938)

MID-CONTINENT GRAVITY SCALE PRICES (Posted January 28, 1937)

(Some fields of Mid-Continent have flat price postings, and are shown separately.)

Gravity	Okla.-Kans.	North La.-Ark.	Rodessa, La.-Tex.	North & W. Cent. Tex.	East Cent. Tex.	Gray Co. Tex.	Carson Hutchinson Co. Tex.	[1]Conroe Tex. Type	West Tex.-N. Mex.	[2]Gulf Coast (Tex.-La.)	[3]Some La. Gulf Areas	[4]Anahauc, Tex. Type	[5]Refugio, Tex. Type	[6]Mirando, Tex. Type
17–17.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*$0.90	.....	.....	.....
18–18.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.92	.....	.....	.....
19–19.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.94	.....	.....	.....
20–20.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	*$0.95	.96	.....	*$1.01	*$0.96
21–21.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.98	.98	.....	1.03	.98
22–22.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.01	1.01	.....	1.05	1.00
23–23.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.04	1.04	.....	1.07	1.02
24–24.9	*$0.98	*$0.90	*$0.93	*$0.88	.....	.....	.....	.....	.....	1.07	1.07	.....	1.09	1.04
25–25.9	1.00	.92	.95	.90	.....	.....	.....	.....	*$0.78	1.10	1.10	.....	1.11	1.06
26–26.9	1.02	.94	.97	.92	.....	.....	.....	.....	.80	1.13	1.13	.....	1.13	1.08
27–27.9	1.04	.96	.99	.94	.....	.....	.....	.....	.82	1.15	1.15	.....	1.15	1.10
28–28.9	1.06	.98	1.01	.96	*$1.03	.....	.....	*$1.20	.84	1.17	1.17	.....	1.17	1.12
29–29.9	1.08	1.00	1.03	.98	1.05	.....	.....	1.22	.86	1.19	1.19	.....	1.19	1.14
30–30.9	1.10	1.02	1.05	1.00	1.07	.....	.....	1.24	.88	1.21	1.21	$1.16	1.21	1.16
31–31.9	1.12	1.04	1.07	1.02	1.09	.....	.....	1.26	.90	1.23	1.23	1.18	1.23	1.18
32–32.9	1.14	1.06	1.09	1.04	1.11	.....	.....	1.28	.92	1.25	1.25	1.20	1.25	1.20
33–33.9	1.16	1.08	1.11	1.06	1.13	.....	.....	1.30	.94	1.27	1.27	1.22	1.27	1.22
34–34.9	1.18	1.10	1.13	1.08	1.15	*$0.96	*$0.91	1.32	.96	1.29	†1.29	1.24	1.29	1.24
35–35.9	1.20	1.12	1.15	1.10	1.17	.98	.93	1.34	.98	1.31	.....	1.26	1.31	1.26
36–36.9	1.22	1.14	1.17	1.12	1.19	1.00	.95	1.36	1.00	1.33	.....	1.28	1.33	1.28
37–37.9	1.24	1.16	1.19	1.14	1.21	1.02	.97	1.38	1.02	1.35	.....	1.30	1.35	1.30
38–38.9	1.26	1.18	1.21	1.16	1.23	1.04	.99	1.40	1.04	1.37	.....	1.32	1.37	1.32
39–39.9	1.28	1.20	1.23	1.18	1.25	1.06	1.01	1.42	1.06	1.39	.....	1.34	1.39	1.34
40 & Above	1.30	1.22	1.25	1.20	1.27	1.08	1.03	1.44	1.08	1.41	.....	1.36	1.41	1.36

* Minimum price and applies also to purchases of lower gravity.

[1] Conroe, Tomball, Satsuma, Raccoon Bend Deep fields.

[2] Upper Texas Gulf Coast, including Goose Creek, Spindle Top, etc., and some fields of Louisiana Gulf Coast, including Black Bayou, White Castle, Vinton, Hackberry, etc., except that top price for those Louisiana fields is $1.29 for 34 gravity and above.

[3] Choctaw, Darrow, Lockport, Iowa (Magnolia posting), Cameron Meadows, etc.

[4] Anahuac, Dickinson, Flour Bluff, Turtle Bay.

[5] Lower Texas Gulf Coast, including Refugio, Saxet, etc. Posted 7-6-37.

[6] Duval, Jim Hogg, Webb and Zapata Counties; Heyser, Placedo fields. Posted 7-6-37.

† Maximum price and applies also to purchases of higher gravity.

Mid-Continent Flat Prices

	Flat Price	Date Posted
Arkansas:		
Smackover	$0.90	1–28–37
Louisiana:		
Garden Island	1.37	1–28–37
Lafitte	1.24	1–28–37
Texas:		
East Texas	1.35	5–22–37
Talco	.73	1–28–37
Livingston, Cleveland	1.27	1–28–37
Hardin	1.15	1–28–37
Van	1.10	1–28–37
Pettus	1.37	1–28–37
Pecos County	.91	1–28–37
Pecos Shallow	.81	1–28–37
Luling	1.00	1–28–37
Lytton Springs	1.12	1–28–37
Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1.09	1–28–37

Michigan Prices

Central Michigan	$1.27	7–24–37

Middle West Prices

Lima, Ohio	$1.00	11–20–37
Illinois	1.35	1–28–37
Princeton	1.35	1–28–37
Western Kentucky	1.40	1–28–37

Rocky Mountain States Prices

	Flat Price	Date Posted
Colorado:		
Ft. Collins and Wellington, Light	$1.01	1–28–37
Ft. Collins and Wellington, Heavy	1.25	1–28–37
Cannon City and Florence	1.10	1–28–37
Iles, Light	1.18	1–28–37
Iles, Heavy	1.12	1–28–37
Montana:		
Cat Creek	1.30	1– 1–38
Cut Bank	1.35	6– 3–36
Frannie, Light	.82	1–28–37
Frannie, Heavy	.62	11– 4–36
Pondera	1.05	9–29–33
Sunburst	.90	11–16–37
***New Mexico:**		
Hogback	1.33	1–28–37
Wyoming:		
Big Muddy	1.18	1–28–37
Elk Basin	1.30	1–28–37
Graybull-Torchlight	1.30	1–28–37
Grass Creek, Light	1.30	1–28–37
Grass Creek, Heavy	.62	11– 4–36
Hamilton Dome	.57	11– 4–36
Lance Creek	.97	1–28–37
Osage	1.30	1– 1–37
Rock Creek	1.20½	1–28–37
Salt Creek, Tensleep	.70	1– 6–38

* Also see Mid-Continent Gravity-Scale Schedule above.

Pennsylvania Prices

Bradford-National Transit	$2.20	12– 1–37
Sw. Pa. Pipe Line	1.88	12– 1–37
Eureka Pipe Line	1.82	12– 1–37
Buckeye Pipe Line	1.70	12– 1–37
Corning Grade	1.27	12– 1–37

Prices Outside United States

Canada:		
Petrolia	$2.10	9– 9–33
Oil Springs	2.17	9– 9–33
Mexico:		
F.O.B. Tampico; net; U. S. Currency, buyer pays tax	$0.95	Dec..,1937

Major Price Changes

	Penna. (Nat. Tr.)	Mid.-Cont. (36 Gr.)	Calif. (26 Gr.)
June 19,1933	Up 10	Up 19	.....
June 26, 1933	Up 10	.....	Up 9-12
July 6, 1933	Up 13	Up 10	.....
July 17, 1933	Up 15	.....	.....
July 28, 1933	Up 15	.....	.....
August 11, 1933	Up 10	.....	.....
August 24, 1933	.....	Up 10	.....
August 30, 1933	Up 15	.....	.....
September 6, 1933	Up 10	Up 10	Up 15
September 8, 1933	.....	Up 15	.....
May 1, 1934	Up 10	.....	.....
November 6, 1934	Cut 25	.....	.....
December 6, 1934	Cut 25	.....	.....
January 4, 1935	Up 15	.....	.....
February 4, 1935	Up 15	.....	.....
May 16, 1935	Cut 15	.....	.....
June 26, 1935	Cut 15	.....	.....
July 16, 1935	Cut 10	.....	.....
August 29, 1935	.....	.....	Cut *1
September 6, 1935	Up 5	.....	.....
October 29, 1935	Up 15	.....	.....
November 1, 1935	.....	.....	Up *28
November 18, 1935	Up 15	.....	.....
December 6, 1935	.....	.....	Up *9
January 9, 1936	.....	Up 10	.....
January 13, 1936	Up 15	.....	.....
February 26, 1936	.....	.....	Up †5
December 28, 1936	Up 12	.....	.....
January 28, 1937	.....	Up 12	.....
February 24, 1937	Up 10	.....	.....
June 7, 1937	Up 15	.....	.....
September 1, 1937	Cut 22	.....	.....
October 12, 1937	Cut 25	.....	.....
December 1, 1937	Cut 15	.....	.....

* Signal Hill 26 gravity. † Seal Beach 26 gravity.

Crude Production Taxes

Oklahoma—Five percent of gross value less royalty interest.

Texas—2¾ cents or 2¾ percent, whichever is higher.

Louisiana—From four to 11 cents a barrel, depending upon gravity.

Arkansas—2.6 percent of gross market values.

Montana—Two percent of gross value at well and ⅝ of 1c per barrel.

New Mexico—Severance tax of 2 percent on oil and gas.

Wyoming and New Mexico—Production tax based upon state and county assessments.

California—.66443 mills per barrel of oil produced and 17.39 cents an acre on proved lands.

Financial Field

Most late reports on 1937 operations show substantially increased profits . . . General expression is hopeful despite current slowing of general business.

ANNUAL reports for 1937 have been issued by several oil companies, and most of them have shown materially larger earnings than those gained in 1936.

Standard of Jersey

Standard Oil Company of New Jersey is expected to show, for 1937, net earnings of $4.75 to $5.00 a share, as compared with $3.73 a share earned in 1936 and with the record for the company of $4.76 a share in 1929. The company, in 1937, paid out dividends totaling $65,650,000, or $2.50 a share, compared with $2 a share in the previous year.

Panhandle Eastern

Panhandle Eastern Pipe Line Company, in 1937, had a net income of $3,759,528, compared with $1,711,185 earned in 1936. The company, in 1937, spent $11,750,000 for expanding production and transportation facilities. The company borrowed $4,900,000 to cover the expansion, but by the end of the year had reduced that amount to $4,625,000. The company produces natural gas in the Texas Panhandle and transports the gas to the Middle-Western states, where it is handled through subsidiaries or sold to other distributing companies.

Panhandle Producing

It has been estimated that Panhandle Producing and Refining Company had, in 1937, a net income of $250,000, after all deductions, compared with the $154,405 actually earned in 1936. The company, in the first nine months of 1937, reported net income of $227,887, compared with $105,131 in the similar period of 1936.

Shell Union

Shell Union Oil Corporation is expected to show a slight decline in earnings for 1937 as compared with the previous year. The 1937 profit is being estimated around $18,500,000. In 1936, the company had a net profit of $22,494,364, after usual deductions, but that figure included a non-recurring profit of $2,829,504 from the sale of an investment.

Union of California

Union Oil Company of California showed, in 1937, a noteworthy improvement in earnings, and attributed the better results to increased sales volumes in both export and domestic business, to better stabilized prices for products, and to increased crude oil production. The company, in 1937, had a net profit of $12,061,332, after usual deductions, equivalent to $2.58 a share. That compared with profit of $6,133,398, or $1.40 a share earned in 1936.

The sales of products by Union of California showed an increase of 28 percent in 1937, compared with the previous year, and amounted to $83,626,601. Production of crude oil and natural gasoline was up 11 percent. The company, in 1937, made capital expenditures of $13,911,355, and of that amount, $8,666,142 was spent for additional leaseholds and in field development.

Atlantic Refining

Atlantic Refining Company and subsidiary companies report a profit of $9,942,000 for 1937, compared with $7,348,000 for 1936. Both figures are after interest, depreciation, taxes, etc. Provision of $3,200 has been made for surtax on undistributed profits for the year 1937.

After provision for dividends on pre-

CALIFORNIA CRUDE OIL PRICES

(Posted February 26, 1936; except El Segundo and Wilmington, posted October 15, 1937, and Greeley and Canal posted December 22, 1937). All gravity above those quoted take highest prices of that field.

Gravity	El Segundo & Signal Hill	Seal Beach Alamitos Heights	Huntington Beach	Inglewood	Playa Del Rey	Olinda Brea Canyon	Athens Rosecrans	Torrance	Richfield	Whittier East Coyote La Habra	Montebello	West Coyote Hills	Santa Springs	New Hall McKittrick Kern River Round Mountain	Greeley, Canal	Mountain view	Midway-Sunset Buena Vista Hills Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Wilmington
14-14.9	$.80	$.79	$.78	$.79	$.80	$.76	....	$.80	$.76	$.76	$.77	$.78	....	$.70	....	....	$.70	$.70	$.70	....	$.75
15-15.9	.80	.79	.78	.79	.80	.76	....	.80	.76	.76	.77	.78	....	.70	....	....	.70	.70	.70	....	.75
16-16.9	.80	.79	.78	.79	.80	.76	....	.80	.76	.76	.77	.78	....	.70	....	....	.70	.70	.70	....	.75
17-17.9	.80	.79	.78	.81	.80	.76	....	.80	.76	.76	.77	.78	....	.70	....	....	.70	.70	.70	....	.77
18-18.9	.80	.79	.78	.84	.80	.78	....	.82	.76	.76	.77	.78	....	.70	....	....	.70	.70	.70	....	.79
19-19.9	.82	.79	.82	.87	.84	.81	....	.85	.76	.78	.77	.78	....	.70	....	$.70	.74	.74	.71	$.70	.82
20-20.9	.85	.79	.85	.90	.88	.84	....	.88	.78	.82	.77	.80	....	....	....	.70	.78	.78	.72	.70	.85
21-21.9	.88	.79	.89	.93	.93	.88	....	.91	.80	.85	.77	.84	$.78	....	....	.73	.82	.82	.74	.70	.88
22-22.9	.92	.82	.92	.96	.98	.92	....	.93	.84	.89	.79	.88	.78	....	....	.77	.87	.86	.78	.72	.92
23-23.9	.95	.86	.96	.99	1.02	.96	$.84	.96	.88	.93	.82	.92	.78	....	....	.80	.92	.90	.82	.76	.95
24-24.9	.99	.91	1.00	1.02	1.06	.99	.88	.99	.91	.96	.85	.96	.82	....	....	.84	.97	.94	.86	.79	.99
25-25.9	1.03	.95	1.03	1.05	1.11	1.03	.93	1.02	.95	...	.89	.99	.86	....	....	.88	1.01	.98	.90	.83	1.03
26-26.9	1.06	1.00	1.07	1.09	1.16	1.06	.98	1.05	.98	...	.92	1.03	.90	Elwood	....	.91	1.06	1.02	...	....	1.06
27-27.9	1.10	1.05	1.11	1.12	....	1.10	1.03	....	1.02	...	.96	1.06	.95	Terrace	$.84	.95	1.10	1.06	...	....	1.10
28-28.9	1.14	1.10	1.14	1.15	....	1.14	1.07	....	1.06	...	.99	1.10	.99	.88	.99	1.15	1.10	...	....	1.14
29-29.9	1.17	1.15	1.18	1.18	F.O.B.	1.17	1.12	....	1.09	...	1.03	1.14	1.03	....	.92	1.02	1.20	1.14	...	....	1.17
30-30.9	1.21	1.19	1.22	1.21	Pipe	1.21	1.17	....	....	...	1.07	1.17	1.08	F.O.B.	.95	1.06	1.25	1.18	...	....	1.21
31-31.9	....	....	....	1.24	Line	1.24	1.22	Kettleman Hills			1.11	1.21	1.12	Ship	.99	1.09	1.29	....	...	....	....
32-32.9	....	....	....	1.27	....	1.27	1.27				1.14	1.25	1.16	....	1.03	1.13	1.34	....	...	....	....
33-33.9	....	....	....	....	....	....	1.32	1.19			1.18	1.28	1.20	1.28	1.07	1.17	1.38	....	...	....	....
34-34.9	....	....	....	....	....	....	1.37	....	1.23	...	1.22	1.32	1.25	1.32	1.11	1.20	....	....	...	....	....
35-35.9	....	....	....	....	....	....	1.42	....	1.27	...	1.25	....	1.29	1.35	1.15	....	....	....	...	....	....
36-36.9	....	....	....	....	....	....	1.46	....	1.31	...	1.29	....	1.33	1.39	1.19	....	....	....	...	....	....
37-37.9	....	....	....	....	....	....	1.51	....	1.35	...	1.32	....	1.37	1.43	1.23	....	....	....	...	....	....
38-38.9	....	....	....	....	....	....	1.56	....	1.39	...	1.36	....	1.42	....	1.27	....	....	....	...	....	....
39-39.9	....	....	....	....	....	....	1.61	....	1.43	...	1.40	....	....	....	1.31	....	....	....	...	....	....
40-40.9	....	....	....	....	....	....	1.66	....	....	...	1.43	....	....	....	1.34	....	....	....	...	....	....
41-41.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.38	....	....	....	...	....	....
42-24.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.41	....	....	....	...	....	....
43-43.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.45	....	....	....	...	....	....
44-44.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.49	....	....	....	...	....	....
45-45.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.53	....	....	....	...	....	....
46-46.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.56	....	....	....	...	....	....
47-47.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.60	....	....	....	...	....	....
48-48.9	....	....	....	....	....	....	....	....	....	...	....	....	....	....	1.64	....	....	....	...	....	....

ferred stock, the profit per share on common stock was $3.51 for 1937 as compared with $2.59 for 1936.

Lion; Quaker; Bishop

Lion Oil Refining Company and subsidiaries report for 1937 a net profit of $945,334, after usual deductions. That compared with a net profit of $594,735 earned in 1936.

Quaker State Oil Refining Corporation and subsidiaries showed for 1937 net profit of $1,041,848, compared with $1,041,034 in the previous year.

Bishop Oil Corporation, of San Francisco, has reported for 1937 a net profit of $320,481, or nearly twice as much as the $178,019 earned in 1936. The company's gross income for 1937 was $924,247, as compared with $623,518 in the previous year.

Indiana Pipe; El Paso

Indiana Pipe Line Company has reported for 1937 a net income of $309,039, after charges, compared with $301,143 in the previous year.

El Paso Natural Gas Company showed material improvement in earnings in 1937, reporting net profit of $1,884,882, after usual deductions, compared with $1,071,828 earned in the previous year.

Sun Oil Company

J. Howard Pew, president of Sun Oil Company, stated in the company's annual report that "conditions at this time do not justify optimism as to the immediate future." He referred to the fact that the business depression of late 1937 was continuing into 1938.

For 1937, Sun Oil Company and subsidiaries reported net profit of $9,544,084, after the customary deductions, or about 26 percent more than the $7,563,554 of profit in 1936.

The Sun company indicated it had, during 1937, a net increase in its proved reserves of crude oil. At the end of 1937, the reserves were estimated at 233,000,000 barrels, compared with 200,000,000 one year previously.

The company had in 1937 a net production of crude oil of 13,597,085 barrels. The company during the year purchased some crude oil and sold some, but the net excess of purchases over sales amounted to 11,415,467 barrels. At the end of the year, the company owned 1869 producing wells. In 1937, it drilled 295 wells, of which 243 were producers of oil, 9 were gas wells, and 43 were dry holes. The company also participated in the drilling of 112 other wells.

The Sun company's crude oil runs to stills during 1937 amounted to 25,860,582 barrels, a slight increase over 1936. Its refinery capacity now is 80,000 barrels daily. The company in 1937 made capital expenditures approximating $14,000,000. Of that amount, about $6,500,000 went into the production division, $2,660,000 into the refining division, $3,320,000 into marketing, $1,020,000 into the marine department, and the remaining $500,000 into various other improvements.

Standard of Kansas

Standard Oil Company of Kansas has reported for 1937 a net profit of $781,783, including $332,659 profit on sales of leases and royalties, and after federal income taxes, depreciation, depletion, interest, and other usual charges. In 1936, the company had a net profit of $257,081.

Houston Oil

Houston Oil Company of Texas and subsidiary, Houston Pipe Line Company, report for 1937 a net income of $1,574,327, or about three times the $500,441 earned in the previous year. This is after payment of dividend on 6 percent preferred stock, and is equivalent to 95 cents a share on 1,098,618 shares of common stock. Gross income was $8,099,867, compared with $6,274,544 in the previous year. The company during the year had total production of 3,373,771 barrels of crude oil, or 9243 barrels daily on the average.

Texas Gulf Producing

Texas Gulf Producing Company, oil producing concern, of Houston, Texas, in the past year reduced its mortgage indebtedness from income in the total amount of $555,608 and slightly increased its working capital. This was revealed by M. C. McGehee, Jr., president, in an annual report.

Meanwhile, it was pointed out, the company maintained its production and carried on the necessary development of its proven properties. It is the announced aim of the company to maintain this progress and to continue its efforts to build up the company by the addition of new oil reserves at minimum cost.

The company in 1937 had a total net income of $604,584, or 68 cents a share on each of the 888,134 shares of stock outstanding. That compared with $823,410 or 92 cents a share in 1936. The net income for 1937 was lower despite a 7 percent increase in operating income, because of non-recurring deductions for 1937. Those deductions included about $100,000 in losses on leaseholds abandoned and $238,000 set aside as a provision for contingencies.

The company's production for the year totaled 1,910,675 barrels, an average of 5235 barrels daily, which was 2.4 percent more than in 1936.

Field work during the year included working-over of 11 wells in the Barbers Hill field, which then showed initial production averaging 235 barrels daily per well; completion of 2 new wells in the same field, with average initial production of 532 barrels daily per well; and completion of 3 new wells at Blue Ridge field, with average daily production initially of 400 barrels per well.

M. C. McGehee, Jr., of Houston, became president of the company in June, 1937, when N. W. Hunter resigned. The latter has been succeeded as a director by J. A. Elkins, attorney, of Houston. Henry M. Brown of Houston and W. J. Morton of New York are vice presidents, and Doyle Smith of Houston is secretary-treasurer.

Navarro Oil Company

A hopeful attitude regarding prospects for 1938 was expressed in the annual report to stockholders by S. P. Farish, president of the Navarro Oil Company.

"While the future course of business is somewhat beclouded by uncertainties, and there are some phases of the oil business in particular that may influence the trend unfavorably," he stated, "we believe consumption and production will again balance shortly and we shall enjoy enough benefit to class 1938 as a good year."

The report showed that Navarro Oil Company, in 1937, earned more than twice as much as in 1936. The net profit for 1937 was $674,933, compared with $295,015 in 1936. The profit for 1937, based on the 355,594 shares outstanding at the end of the year, was the equivalent of $1.90 a share.

The company, in 1937, paid dividends aggregating 50 cents a share, having disbursed 20 cents a share, January 2, and 10 cents a share on each of the dates, March 31, June 30, and September 30.

The report by Farish embodied the statement that the company, in 1937, increased its reserves of crude oil over its withdrawals by a comfortable margin and that the company's current daily production is running around 4000 barrels a day, or about 30 percent higher than one year previously, despite drastic cuts in allowables.

The company anticipates for 1938 the drilling of 36 wells and also the carrying of its proportional share of the cost of 18 wells to be drilled by others.

In 1937, the Navarro Oil Company drilled 52 wells, of which 39 were fully owned by the company, and 13 were owned jointly with ohers. The 39 full interest wells included 2 wildcats that proved to be dry, while the rest were commercial producers. In addition, the company owned working interests in 30 wells that were drilled by others, making a total of 82 new wells drilled wholly or partially by the company during the year, all of which were producers except two.

Directors of Navarro Oil Company include S. P. Farish, W. M. Rice, J. O. Winston, Jr., F. W. Michaux, Jr., and Guy Graham.

Officers include: S. P. Farish, president; J. O. Winston, Jr., vice president and treasurer; F. W. Michaux, Jr., vice president; Guy Graham, secretary; and M. W. Kennon, assistant treasurer and assistant secretary.

Dividends Declared

Oklahoma Gas & Electric Company, through its board of directors, has announced the regular quarterly dividends of 1½ percent a share on the 6 percent cumulative preferred stock and 1¾ percent a share on the 7 percent cumulative preferred stock. Both are payable March 15 to stockholders on record as of February 28.

Directors of Socony-Vacuum Oil Company, Inc. have declared a dividend of 25 cents a share, payable March 15, 1938, to stockholders of record February 21, 1938.

Directors of Sunray Oil Corporation have declared the regular quarterly dividend of 68.75 cents per share on the outstanding preferred stock. This is payable April 1 to holders of record March 8.

Earnings of the company for 1937 were between 50 and 60 cents per share of the common against 27 cents in the preceding year, according to estimates by C. H. Wright, president. He said that estimates by independent engineers had placed the company's underground reserves at the end of the year at approximately 24,000,000 barrels, about double similar estimates at the end of 1936.

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Regulatory Agency Reports Provide Check on Texas Operations

By J. S. NOLAND, Proration Manager
and
R. D. CURTIS, Proration Engineer,
Barnsdall Oil Company

THE prevention of waste and conservation of natural resources probably is the foremost thought in the minds of all people interested in the economics of the United States. The various states have enacted laws, rules and regulations for the purpose of enforcing such conservation and prevention of waste.

The Railroad Commission of Texas is charged with the duty of enforcing the oil and gas conservation statutes in that state. It has as complete a system of reports and forms as can be found in any state. This article has been prepared with the hope that it might be of help to those who heretofore have not given careful consideration to the subject matter.

The Texas Commission requires the filing of numerous reports and forms by all branches of the oil industry.

It is the duty of all operators to cooperate with the Railroad Commission to the fullest extent. This regulatory agency is to be commended on the work it has been doing and on its spirit of cooperation in satisfying the individual requirements of a large number of operating units. These units should reciprocate in every possible way. The filing of the required reports and forms in an accurate and prompt manner constitutes one important method of cooperation which all members and employes of the Railroad Commission will appreciate. Thus, the burdens of both the commission and the operator will be lightened and a harmonious relationship through cooperation will exist to the betterment of the oil industry. The individual operator will find that he has fewer difficulties with the regulatory agencies in any state when an effort is made on his part to cooperate at all times with those agencies.

In order to gain an idea of some of the necessary requirements a listing of forms and reports by operating units has ben prepared, as shown in Table 1. Figure 1 is a graphical representation which is designed in "flow-sheet" form and is used in connection with Table 1. These were prepared in an attempt to simplify the operator's problem regarding the proper forms and reports which he must file. For complete information the oil and gas laws and orders of the Railroad Commission prescribing rules and regulations should be consulted.

Every person connected with the Texas oil industry should acquaint himself with the laws, rules and reg-

TABLE 1

Railroad Commission of Texas—Reports and Forms to be Filed by Producers, Transporters and Refiners of Crude Oil and Products*

PRODUCING COMPANY REPORTS

Form 1. Notice of Intention to Drill or Deepen.†
Form 2. Well Record. (Completion Report.)
Form 2A. Notice of Intention to Plug.
Form 4. Plugging Record.
Form 7. Organization Report.
Form 12. Application for Certificate Snowing Compliance With Conservation Laws and Rules. (Prior to Pipe Line Connection.)
Form 15. Application to Shoot or Treat with Acid and Statement of Well Condition Before Shooting.
Form 16. Statement of Well Condition After Shooting.
Potential Test Form.
Tender Form SW-1. Producers Authorization (For Pipe Line Company Connection).
Statewide Form EB. Monthly Producers Report.
Form ES. Application to Clean Tanks or Pits.
Statewide Form GO-1. Monthly Report of Condensate and/or Crude Oil Produced from Gas Wells.
Form GO-2. Producers Gas-Oil Ratio Report.
Form 3-266. Monthly Report on Gas Wells and Gas Pipe Lines (Gas Used on Producers Properties).
Nominations For Purchase of Natural Gas. (Gas Used on Producers Properties.)
Gas Well Report. Open Flow and Rock Pressure (Semi-Annual).
Form 200. (State Comptroller) Monthly Production and Sales.
Form 202. (State Comptroller) Monthly Deliveries from Storage.

† For regular location. If exception to Spacing Rules, operator must apply for Special Permit under R. R. Comm. Rule 37.

REFINING COMPANY REPORTS

Form 7. Organization Reports.
Tender Form SW-4. Products Tender (Certificate Required From Comptroller snowing quantity of Gasoline on which Applicant has paid taxes; Not Required on Gasoline for Interstate or Foreign Commerce).
Tender Form SW-3. Crude Oil Transfer, Interstate. (Imports.)
Tender Form SW-6. Tender Operations Statement (Mo.).
Tender Form SW-5A. Manifest (Truck Shipments).
Form EH-3. Monthly Refinery Operations.
Form EH-5. Monthly Manifest Report. (Actual Deliveries on SW-5A Tenders.)
Form 100. (State Comptroller) Direct Lease Purchases.
Form 100-B. (State Comptroller) Crude Transactions in State.
Form 247-C. (State Comptroller) Monthly Motor Fuel Report.

TRUCKING REPORTS

Tender Form SW-5A. Manifest (Truck Shipment).
Form EH-5. Monthly Manifest Report. (Actual Deliveries on SW-5A Tenders.)

PIPE LINE COMPANY REPORTS

Form 7. Organization Report.
Annual Pipe Line Report.
Annual Application For Permit To Do Business.
Permits For Proposed Lines.
Tender Form SW-2. Forecast Tender (Field Gatherer).
Tender Form SW-3. Crude Oil Transfer Tender.
Tender Form SW-4. Products Tender.
Tender Form SW-6. Tender Operations Statement (Mo.).
Statewide Form ED-1. Monthly Pipe Line and Crude Oil Storage Report.
Form C-1. Crude Oil Nominations for 6 Months (Mo.).
Form 100. (State Comptroller) Monthly Report, Direct Lease purchases of Crude Oil.
Form 100-B. (State Comptroller) Crude Transactions Within State (Mo.).
Form 300. (State Comptroller) Crude Oil Transported (Mo.).

GASOLINE PLANT REPORTS

Permit To Operate. Required Where Both Sweet and Sour Gas Are Produced In Field.
Form 7. Organization Report.
Tender Form SW-4. Products Tender.
Tender Form SW-6. Tender Operations Statement (Mo.).
Form EH-4. Monthly Gasoline Plant Report.
Form 3-266. Gas Purchases From Gas Wells (Mo.).
Form 1-407. Monthly Operations Report (In Fields Producing Both Sweet and Sour (Gas
Form 247-C. (State Comptroller) Monthly Motor Fuel Report.
Form 150. (State Comptroller) Monthly Gas Purchases Report.

GAS PURCHASERS REPORTS

Form 7. Organization Report.
Form 3-266. Monthly Report On Gas Wells and Gas Pipe Lines.
Form 150. (State Comptroller) Monthly Gas Purchases Reports.
Monthly Gas Nominations.
Gas Well Report. Open Flow and Rock Pressure (Semi-Annual).
Odorization Reports. (As Required.)

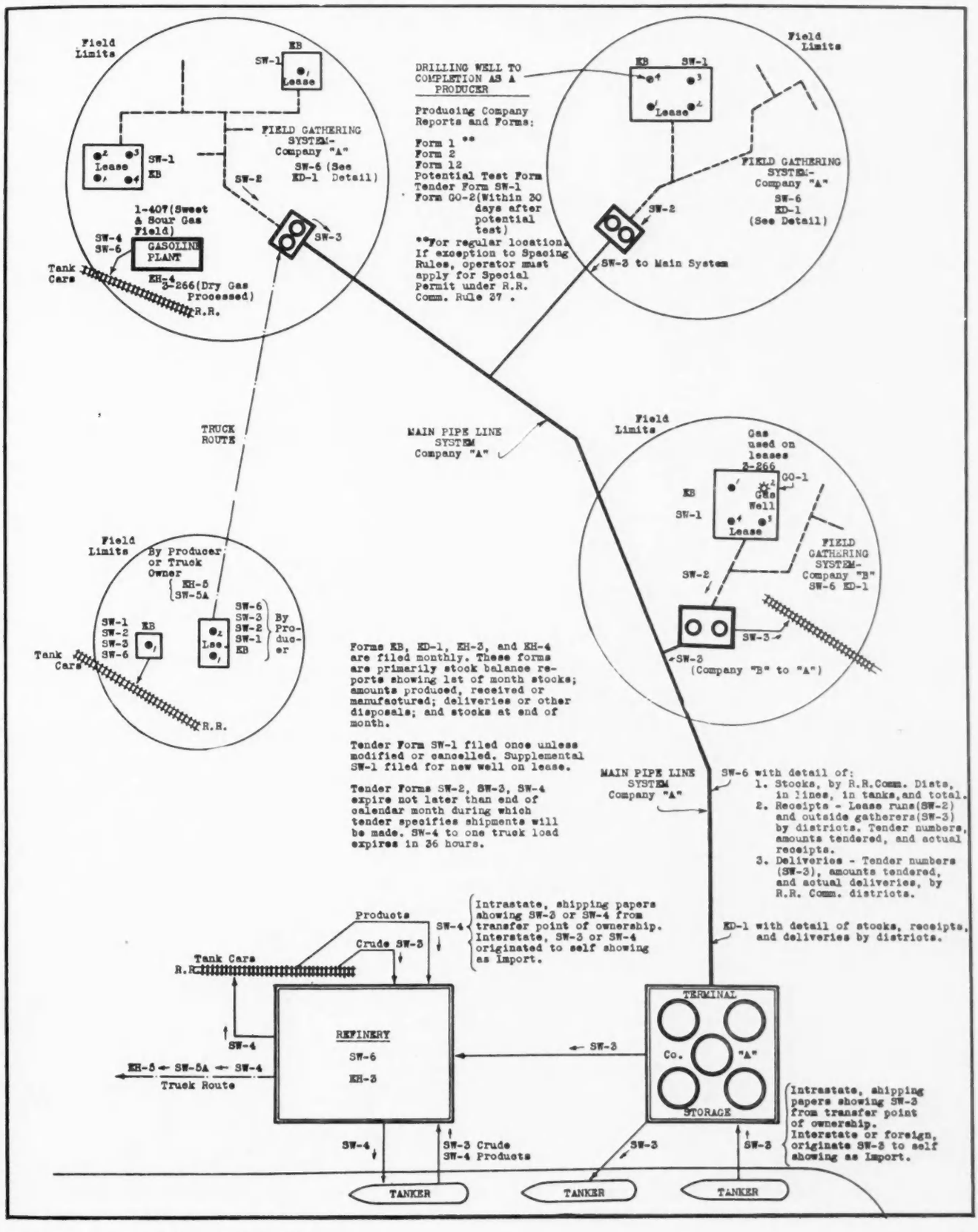
* **Note**—Reports and Forms of major importance. Other Reports may be required by Railroad Commission. In addition, Monthly Crude Stock and Petroleum Reports made to U. S. Bureau of Mines, Federal Corporation Income Tax Returns made annually, Monthly Report of oil transported by pipe lines made to Collector of Internal Revenue.

ulations which govern the operations over which he has control. These may be obtained by request from the Railroad Commission. There has been recently issued, by an oil reporting firm a compilation of the rules and regulations in Texas. This is made up in loose-leaf form and is revised monthly. Cost of the service is nominal.

Acknowledgement is due employes of the Railroad Commission and various others from whom many helpful suggestions and criticisms have made this compilation and graphical presentation possible.

The State of Louisiana has set up an extensive testing laboratory at Louisiana State University, Baton Rouge. Expansion of present facilities are contemplated for the near future to include highly modern gas and petroleum testing and analysis equipment. J. B. Feishud, Jr., Senior Chemical Engineer, is in charge, assisted by C. L. Davis, Jr., Chemical Engineer and by Dan Grady, Mechanical Engineer.

FIGURE 1


Field Limits
EB
SW-1
Lease
FIELD GATHERING SYSTEM- Company "A"
SW-6 (See ED-1 Detail)
SW-2
SW-3
1-407(Sweet & Sour Gas Field)
SW-4
SW-6
GASOLINE PLANT
Tank Cars
EH-4
3-266(Dry Gas Processed)
R.R.
DRILLING WELL TO COMPLETION AS A PRODUCER
Producing Company Reports and Forms:
Form 1 **
Form 2
Form 12
Potential Test Form
Tender Form SW-1
Form GO-2(Within 30 days after potential test)
**For regular location. If exception to Spacing Rules, operator must apply for Special Permit under R.R. Comm. Rule 37 .
SW-2 to Main System
TRUCK ROUTE
MAIN PIPE LINE SYSTEM Company "A"
Gas used on leases 3-266
GO-1
Gas Well
FIELD GATHERING SYSTEM- Company "B" SW-6 ED-1
SW-2 (Company "B" to "A")
By Producer or Truck Owner
EH-5
SW-5A
SW-1
SW-2
SW-3
SW-6
By Producer
Forms EB, ED-1, EH-3, and EH-4 are filed monthly. These forms are primarily stock balance reports showing 1st of month stocks; amounts produced, received or manufactured; deliveries or other disposals; and stocks at end of month.
Tender Form SW-1 filed once unless modified or cancelled. Supplemental SW-1 filed for new well on lease.
Tender Forms SW-2, SW-3, SW-4 expire not later than end of calendar month during which tender specifies shipments will be made. SW-4 to one truck load expires in 36 hours.
SW-6 with detail of:
1. Stocks, by R.R.Comm. Dists, in lines, in tanks, and total.
2. Receipts - Lease runs(SW-2) and outside gatherers(SW-3) by districts. Tender numbers, amounts tendered, and actual receipts.
3. Deliveries - Tender numbers (SW-3), amounts tendered, and actual deliveries, by R.R. Comm. districts.
ED-1 with detail of stocks, receipts, and deliveries by districts.
Products
Crude SW-3
SW-4
Intrastate, shipping papers showing SW-2 or SW-4 from transfer point of ownership. Interstate, SW-3 or SW-4 originated to self showing as Import.
Tank Cars
REFINERY
SW-6
EH-3
TERMINAL
Co. "A"
STORAGE
EH-5 ← SW-5A ← SW-4
Truck Route
SW-3 Crude
SW-4 Products
Intrastate, shipping papers showing SW-3 from transfer point of ownership. Interstate or foreign, originate SW-3 to self showing as Import.
TANKER
TANKER
TANKER

WORLD DEVELOPMENT and TECHNOLOGY

Edited by
WM. V. GROSS, Associate Editor

Japan to Be Busy

Nippon Oil Company to spend 20 million yen in three years; to prospect 164 fields during 1938.

NIPPON Oil Company has earmarked an amount of 20,000,000 yen to be expended over three years in connection with its new drilling program. It has been decided to prospect 164 fields during the 1938 fiscal year.

Drilling Subsidy to Be Increased

As part of its Natural Resource Development Five-Year Program, the Japanese Government has decided to include an item of 4,000,000 yen in the next budget as the first-year subsidy to oil prospectors. The amount will be increased to 25,000,000 yen in the fifth year. The current subsidy is 3,000,000 yen a year.

The Otaki Gas Chemical Industrial Company, established with the object of recovering iodine and bromine from underground brine, is expected to commence operation in March. The present plan calls for a monthly production of 100 pounds of iodine and 80 pounds of bromine. The Otaki is Japan's largest natural-gas producer, and the firm has supplied gas for domestic heating purposes for more than 100 years.

Mitsubishi to Erect Two Tanks

Mitsubishi Trading Company has decided to build two sets of heavy-oil tanks in the port of Niigata. The smaller, with a capacity of 3,000 tons, will be for the storage of imported heavy oil, while the larger will be used for storing 5,000 tons of domestically produced heavy oil.

Kokura Oil Markets Diesel Fuel

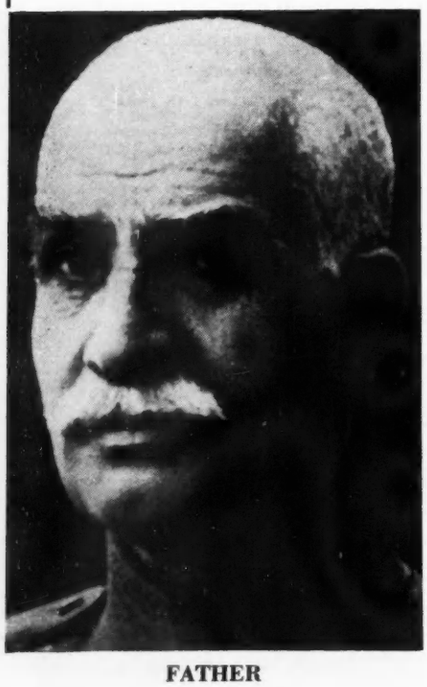
Kokura Oil Company has announced a new fuel for Diesel engines to be known under the trade name Dieselit. Dieselit is said to be the first purely domestically produced Diesel oil. The market has been practically monopolized by Tarakan.

Korean Company to Export

Korean Oil Company, producing more than enough to meet the demand for petroleum products in the peninsula, has decided to export the surplus to Manchukuo. The necessary permission of the government general has already been obtained. The company plans to open a branch office in Hsinking.

As the petroleum monopoly system in Manchukuo does not permit, as a principle, imports of gasoline, the Korean company will go in for machine oil and lubricants.

Competitive Interests Are to Be Desired in the Development of a Nation's Resources, These Two Believe



FATHER

At left: His Imperial Majesty, Reza Shah Pahlavi, ruler of Iran.

At right: His Royal Highness, Shapour Reza Pahlavi, crown prince of Iran.

Note: Permission given Amiranian Oil Company to search for oil in Iran recently furnished the competitive element. For years Anglo-Iranian Oil Company has produced practically all of the nation's commercial oil.

SON

Field Is Faulted

Hume offers same as explanation of differences in potentials of west flank Turner Valley producers.

A FAULT plane on the southwest flank of Turner Valley field, Canada, was reported last week by Dr. G. S. Hume, geologist with the Dominion department of mines and resources, which appears to explain wide differences in production between Royalite Oil Company's Sterling-Pacific Nos. 4 and 6, and wells of the West Flank Oil Company, Ltd., in adjoining 80-acre tracts to the west. The Sterling-Pacific wells, in Legal Subdivisions 4 and 5 of Section 33, Township 18, 2-w5, are producing under potentials of 2052 and 2141 barrels, respectively, while the neighboring three wells of the West Flank Company, in Legal Subdivisions 1 and 8, Section 32, are producing under potentials of approximately 300 barrels each. A quarter mile farther west, and slightly south of the West Flank wells, is Commoil, Limited's record producer with a potential of 2998 barrels.

The fault plane, according to the findings of Dominion geologists reported by Dr. Hume, starts about 25 yards west of Four Star Petroleums, Ltd.'s producer on Legal Subdivision 13, Section 28, and extends north and slightly west about a mile to a point just south of Royalite Oil Company's 28, Legal Subdivision 16, Section 32. Royalite's 28, completed a week ago, was producing in the neighborhood of 500 barrels daily last week, officials reported. Acid treatment is to be given, and if the well responds as did many other valley wells, its potential may be boosted to three times the 500-barrel figure. At the West Flank Company's 1, a premature explosion of 60 quarts of nitroglycerine caused when the charge became stuck in the hole delayed plans to shoot the well with 800 quarts. It is hoped the nitro shot will break through the fault and result in a larger producer.

Highwood Penetrates Fault

To the west of present production in the vicinity of the Highwood River, Okalta Oils, Ltd.'s 6, Legal Subdivision 3, Section 30, Township 18, 2-w5, is the only well that has penetrated through the Outwest fault into the Turner Valley structure under it, Dr. Hume pointed out. A half mile east of the Okalta well, and a quarter mile south, Scottish Petroleums, Limited's 1, Legal Subdivision 16, Section 19, is drilling at 750 feet but has not yet reached a sufficient depth to penetrate the Outwest fault. It is, therefore, as yet unknown as to what distance and at what rate the strata on the west flank of Turner Valley dips westerly without interruption.

With substitution of standard cable tool equipment at 3800 feet with a modern heavy rotary rig, Okalta 6 last week was well on the way toward a new drilling record for Alberta. It drilled the first two days with the rotary at the rate of seven feet an hour, an unusual speed for Turner Valley operations. Okalta is the only one of the old landholding or "parent" companies undertaking an active development program of its own, other companies leasing their acreage on a royalty basis. Okalta has two other tests drilling, both making satisfactory progress with standard tools.

A sudden shift in temperature from sub-zero, which slowed operations for several weeks to abnormally warm weather with temperatures above the 50-degree mark, took place last week and brought resumption of normal drilling operations.

Spy Hill Royalties, Limited's 1, Legal Subdivision 16, Section 20, Township 18, 2-w5, completed a week ago, has insufficient gas pressure to give satisfactory production. Following shooting of the West Flank Company's 1, scheduled for this week, a nitro shot will be given the Spy Hill test in an effort to increase the gas pressure. Drilled by Anglo-Canadian Development & Holding Company, Ltd., it is on a 40-acre tract just west of Davies Petroleums, Ltd.'s 2, with a potential of 2313 barrels daily, and just north of Monarch Royalties, Ltd.'s 1, having a potential of 591 barrels.

Green Valley Petroleums, Ltd.'s Banner 1, Legal Subdivision 6, Section 34, Township 17, 3-w5, wildcat on the Highwood-Sinclair structure west of Turner Valley, was delayed near the end of the week when a bit and stem dropped into the hole. The fishing job was postponed pending arrival of a new 7000-foot line from Calgary. The tools are believed to be standing straight up in the hole and should present only a minor fishing job. The test, at 5796 feet, is 436 feet in the Madison limestone with only a trace of oil in two soft spots encountered in the past 100 feet. Commercial production is expected when the bit penetrates the first porous horizon.

Falmouth suggests England stop oil-from-coal trials

A recommendation that Great Britain continue to depend on imported fuel oil supplies rather than home sources, such as oil extracted from coal, recently was made by sub-committee of the Committee for Imperial Defense headed by Viscount Falmouth, engineer and power authority.

Declaring that imported supplies were the "most reliable and economic means of providing for an emergency," the report recommended that development of oil products from coal should be concentrated on products more costly and less available, rather than on fuel oil. The existing form of government assistance, amounting to a guaranteed preference for home-produced oil and a grant of fourpence (eight cents) a gallon, the committee recommended be continued for 12 years, and it was urged that the fourpence be increased to eightpence to encourage development.

Before possibilities of obtaining oil from coal processes could be assessed, further research and development are necessary, the report declared. A new plant giving 150,000 tons yearly would need an estimated capital of 8,000,000 pounds ($40,000,000), and it was said that Imperial Chemical Industries, now producing oil from coal at its Bellingham plant, was not willing to increase its commitments. At present, home production amounts to about 7 percent of normal motor fuel consumption.

The committee found that chief possibilities of expanding home production lie in hydrogenation and processes like the Fischer process in use in Germany. There is no practical experience in the United Kingdom in working the Fischer process, and at the present time hydrogenation is limited to production of light oils. Low temperature carbonization, the report said, must be ignored as a possible substantial source of oil supply.

DEADLINE

MEXICO CITY, March 4.—Oil companies have been granted until noon March 7 to comply with verdicts of the Mexican supreme court and federal conciliation board for the explained purpose of affording them ample time to confirm to the mandates.

Egyptian wildcat shows

Anglo-Egyptian Oilfields, Limited, which for years has been the only commercial producer of crude oil in Egypt, reports showings of oil and minor showings of gas in a wildcat being drilled on the concession centering around Ras Gharib. The showings were logged between 1412 and 1902 feet.

Egypt is due for considerable wildcatting during 1938 as several of the world's largest integrated oil companies now hold exploratory concessions around the Red Sea and along the shores of the Gulf of Suez.

Attock has three tests drilling in Dhulian

A recently spudded test in Dhulian field, India, gives Attock Oil Company three drilling operations there in the program of developing the deeper pay.

One well, completed at 7715 feet in the deep pay, is producing at the rate of 480 barrels per day through quarter-inch choke as against 550 barrels in June of 1937. Another completion in the deep pay at 7659 feet yielded 800 barrels initially in November and in February was producing 640 barrels per day through 5/16-inch choke.

Dhulian's deep sand, yielding green oil, is 2000 feet deeper than that pro-

ducing from Attock Oil Company's leases in Khaur field. Completing wells at Dhulian is easier, however, due to the absence of extreme pressures encountered at Khaur.

Production of the company from Khaur field in 1937 amounted to 77,754 barrels; from Dhulian, 173,000 barrels. It's daily average from both fields was 687 barrels in 1937, compared with about 300 barrels in 1936.

Uruguay to have three wildcats drilled in 1938

Plans of the Institutuo Geologico del Uruguay call for drilling three wildcats in 1938, according to word received from Montevideo recently.

In speaking of the Gondwana rocks of Uruguay, Dr. J. D. Falconer states: Only in the eastern part of Cerro Largo do they develop structures that would be favorable to the subterranean of petroleum, but here, as elsewhere, surface indications fail to afford any clue to its occurrence below. In the northern part of the department of Rivera Gondwana rocks exhibit in places structural architecture that would be favorable preservation of oil pools, but there are no surface indications of such hidden reservoirs.

Falconer says the matter of finding oil in Uruguay is beyond the realm of surface geology, but that some additional information might be obtained by systematic use of geophysics before or along with drilling.

Mexican output

Mexico started 1938 with oil production at as high a level as that which obtained late in 1936; the ministry of national economy estimates an output of 4,141,663 barrels in January. That compares with 4,349,415 barrels in December and 4,233,635 barrels in January, 1937.

The ministry announces a total production of 46,906,624 barrels in 1937, of which 36,921,690 barrels were light crude and 9,984,834, heavy crude. Last year's production, which compared with 41,027,915 barrels in 1936, was the highest that Mexico had had since 1927. The Poza Rica belt, with an output of 18,696,283 barrels, was Mexico's biggest producer last year. Other large contributors were: El Plan, worked almost entirely by Mexican Eagle Oil Company: 6,744,176 barrels(light crude); Panuco: 3,397,216 (heavy); Cacalilao: 3,298,564 (heavy); Tepetate-Chinamapa-Amatlan-Zacamixtle: 3,040,970 (light); Tonala (Eagle field): 2,682,798 (light), and Toteco-Cerro Azul: 2,636,944 (light).

But 15 drilling permits were granted as follows from January 20 to February 14: Mexican Eagle Oil Company: wells Poza Rica 21, 22 and 23 and El Plan (southern Vera Cruz state) 76, 77 and 78; Kern Mex Oilfields, S. A.: La Palma 55, 56 and 57, Los Montecillos belt, Panuco, Vera Cruz; Cia. de Petroleo y Sus Derivados, S. A.: Willis 1, 2 and 3, El Ingenio hacienda, Panuco; Cia. de Inversiones Aztlan, S. A.: Amatlan 13, Amatlan, Vera Cruz; Teodoro M. Arriaga: Arriaga 4, Altamira, Tamaulipas state, and Pedro Sanchez Navarro: V. P. 10, Salinas fields, Panuco.

OKLAHOMA FIELDS

Sac and Fox pool production extended two miles west.

* * *

Ramsey outpost finds formations high with poor shows.

Tulsa.—One pool was extended in Oklahoma as the state ended another quiet week. The most closely watched area continues to be the Ramsey pool in Payne County, where a wildcat several miles to the southeast was checking rather high but had a poor showing in first Wilcox sand which was dry and slightly salty.

Exploration was going ahead in southern Oklahoma with an old well in the Hewitt field of Carter County to be deepened in search of lower pay horizons.

Wilcox Oil & Gas Company's Royer 1, SEc NE 18-14n-6e, extended the Sac and Fox pool two miles west when it found good saturation in Prue sand from 3245 to 3373 feet. The test was shut down to run casing and rig up standard tools before drilling in for a test.

While potentials were being completed at the three new producers in the Ramsey pool, Payne County, operators were turning their attention to the southwest where Helmerich & Payne et al's Ritchey 1, CNE SW 34-18n-1e, had a show of oil in Hunton lime and drilled ahead to find the first Wilcox sand white, dry and slightly salty. A core from 5245 to 5257 feet had a recovery consisting of 5 feet of sandy dolomite and 5 feet of the white sand. It was reaming at 5257 feet to drill ahead to second Wilcox sand. A slight show of gas was reported in Hunton lime from 5049 to 5055 feet. After topping dense lime at 5210 feet earlier in the week, a core was taken from 5237 to 5245 feet for a 6-foot recovery of dense lime, brown dolomite and sandy dolomite with no show.

The offset producers on the community block made the following potentials: Mid-Continent et al's Brandon 1, SEc NE 13-18n-1e, 11,280 barrels; Columbia 1, NWc SW 13-18n-2e, 11,232 barrels, and Wetzel

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OKLAHOMA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ATOKA COUNTY—		
S. P. McGill, Gilbreath 1, ne sw se 5-1n-15e	*	330
CADDO COUNTY—		
J. B. Nichols, Royce 3, nw nw ne 12-5n-9w	*	3272
I.T.I.O., Dome-Bo 1, cen se¼ 29-6n-10w	*	3555
CARTER COUNTY—		
F. W. Merrick, Mitchell 2, cw½ e½ se sw se 24-1s-3w	*	1620
Kewanee O&G, Jones 37, se se nw 4-4s-3w	¶	2430
Magnolia, Thompson 14, se ne nw 9-4s-3w (pb 1005)	5	1092
COAL COUNTY—		
Carter, Buck 1, ce¼ se sw 6-1n-8e (otd 4002)	44	4138
CREEK COUNTY—		
O. M. Ireland, Ella Bair 4, cw½ nw sw 11-17n-10e	20	1793
GRADY COUNTY—		
T. H. McCasland, Ray Horton 2, sw ne nw 8-3n-5w (pb 2008)	25	2919
OKLAHOMA COUNTY—		
I.T.I.O., M. Fuzzell 4, sw sw sw 319-11n-2w (pb 3935)	¶2.1	4455
OSAGE COUNTY—		
I.T.I.O., 454 nw ne nw sw 26-25n-9e (pb 1751)	¶1.2	2155
Mason & Ohio Oil, 6, nw nw se sw 3-24n-12e	15	1566
PAYNE COUNTY—		
Mid-Continent, O. E. Brandon 1, se se ne 13-18n-1e	1916	4791
PAWNEE COUNTY—		
Johnson O&T Co., Beyl 4, nw se ne 27-20n-9e	136	2175
PONTOTOC COUNTY—		
Continental, Thompson 5, sw sw ne 2-1n-7e	255	4129
J. F. Lloyd, Wesley 1-A, nw ne nw 7-3n-7e	*	1200
SEMINOLE COUNTY—		
Gulf, S. Peter 4, sw ne ne 23-5n-7e (pb 4149)	117	4250
Vierson, Factor 2-A, sw sw ne sw 25-5n-7e	*	1231
Westheimer et al, Factor 2-A, n½ n½ nw ne sw 25-5n-7e	*	4032
Magnolia, Fleet-Osborn 1, nw se ne 26-5n-7e (pb 3865)	68	3942
J. Hall et al, Brinlee 1, sw sw ne 27-6n-5e	¶5.8	2325
Rogers & Rogers, Roberts 1, se ne se se 6-6n-8e	40	3035
Smith et al, Austin 2, se ne se 32-7n-6e	250	2911
STEPHENS COUNTY—		
Robinson et al, W. R. Alexander 1, nw ne nw se 30-2n-4w	*	380

*Failures; †Junked; ¶Million cu. ft. gas.

1, NEc SE 13-18n-1e, 10,548 barrels. Ramsey 1, SWc 18-18n-2e, discovery well, made a potential of 13,500 barrels daily.

Northeast of Ritchey 1, Big Chief Drilling Company et al's Moore 1, SE SW NW 17-18n-1e, was drilling below 200 feet.

At the west edge of the community block, J. E. Crosbie, Inc., was spudding Houston 1, SEc NW 13-18n-1e. Location has been made for Houston 2, NE SE NW 13-18n-1e, but work will be held up pending completion of Houston 1.

One half mile south of Wetzel 1, E. H. Moore, Inc., was rigging up at Boyd-Troutman 1, NEc 24-18n-1e, and was to spud before the end of the week. Earlier announcement that the company had made location for Means 1, NWc 19-18n-1e, was in error as the company has only made tentative plans to drill a test there.

Southern Oil Company's Henry 1, CNW NE 10-8s-7e, southwest of Platter in Bryan County, reported another showing of oil last week, the second in two weeks. The

[*Continued on page 98*]

KANSAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BARTON COUNTY—		
Sinclair Prairie, Ed Oeser 1, ne ne sw 17-16s-11w	*	3278
C. B. Davis, Steckel 11, sw sw se 1-20s-11w	15	3279
BUTLER COUNTY—		
Deep Rock, Hill 7, ce¼ e¼ sw nw nw 32-26s-5e	35	2651
Polhamus, Semich 7, sw sw sw 33-27s-7e	*	2880
CLARK COUNTY—		
Olson Oil Co., Lehaman 1, se se sw 20-32s-21w	*	6807
COWLEY COUNTY—		
E. B. Shawver, Blood 1, nw nw sw 2-30s-4e (pb 2815)	15	2817
Green, Manahan 1, nw corner of lot 20 6-30s-8e	380	2820
Trees Oil & Talbot, McMinn 1, ne ne nw 16-31s-6e	*	2995
HARVEY COUNTY—		
Nat'l. Ref. Brown Bros 1, nw se ne 22-23s-2w	*	3515
McPHERSON COUNTY—		
McPherson O&G, Chindberg K-5, se nw nw 32-18s-2w	40	2368
RICE COUNTY—		
Witt et al, Reiff 1, nw nw se 22-18s-10w	345	3277
Gulf, Gossman 3, nw nw se 8-21s-7w	101	3390
Gerbrand-Pulse, Sterling College 1, nw nw nw 27-21s-9w	¶75	3349
RUSSELL COUNTY—		
W. C. McBride, Jellison 2, se ne sw 19-13s-14w	853	2957
Phillips, R. F. Wineteer 2, nw nw se 19-13s-14w	1050	3283
J. J. Hall, Guy Miller "C" 5, sw nw ne 31-14s-13w (otd 2880)	758	3108
L. Miller 4, se nw nw 31-14s-13w	1872	3122
Transwestern, Wm. Polcyn 13, ne se sw 11-14s-15w	1361	3241
Gulf, Hoffman 11, se sw sw 31-15s-13w	1772	3281
Mollie 7, nw nw se 25-15s-14w	1000	3323
SEDGWICK COUNTY—		
Nat'l. Ref., Fee 2, cne se 36-27s-2e	*	2082
Steinbuchel, McAdams 1, sw sw ne 28-29s-1e	*	3790
STAFFORD COUNTY—		
Carter, Andress 1, se ne nw se 2-21s-13w	*	3608
West Kan. O&R, Gates 1, se sw ne 34-22s-11w	*	3667
Hipple et al, Moses 1, sw nw sw 9-22s-13w	*	3807
Atlantic et al, Hitz 1, se se ne 12-22s-13w	*	3723
Ted Hamilton, Hitz 1, ne ne nw 23-22s-13w	*	3851
Stanolind et al, M. Volker "A" 2, nw sw ne 23-24s-11w	1134	3791
SUMNER COUNTY—		
Shawver, Post 1, ne sw ne 34-34s-2e	40	3487

*Failures; †Junked; ¶Million cu. ft. gas.

Geneseo pool extended half mile northwest.

* * *

Barton County well extends to producing spots.

Wichita.—Extensions continued to be the order of business in Kansas last week. The Geneseo pool of Rice County was extended northwest and one well extended producing limits of two pools in Barton County. Two closely followed wildcats were abandoned as the week ended.

Cities Service Oil Company's Zagic 1, NW NE SE 11-18s-8w, a half-mile northwest of the Geneseo pool, drilled to 3224 feet in Siliceous lime and filled 3000 feet with oil. The well was completed for a potential of 1330 barrels of oil. No water was showing. The company immediately made location for Lewis 1, SWc SE 11-18s-8w, a north offset to the new producer.

Farthest east well in the Stumps-Habiger area of Rice County was completed for a potential of 5008 barrels of oil. Test was Bridgeport Machine Company's Habiger 3, NW NE NW 5-18s-10w. Production is from Kansas City-Lansing lime at 3014 feet. The area is one of the most prolific in the state.

One well apparently extended two pools in Barton County. Simpson Oil Company et al's Dick 1, NE NW NW 30-20s-11w, filled 700 feet with oil after plugs were drilled at 3316 feet in Siliceous lime. The test is three quarters of a mile south of the Ellinwood North pool and the same distance west of the Silica West pool.

North of the Ainsworth South pool, Barton County, The Texas Company's Lowry 1, CNL NW SW 2-17s-13w, a wildcat, was deepened from 3350 to 3362 feet and filled 760 feet with fluid, 650 feet of which was water. The fill up was over a period of 8 hours. It was ordered abandoned.

One-quarter mile northwest of the Lake City pool of Barber County, Pryor & Lockhart's Gant 1-B, SEc NW 7-31s-13w, found Siliceous lime at 4642 feet and cored to 4665 feet for a 13-foot recovery which was dry. The test was being plugged. Testing dry in Viola lime, producing formation of the field proper, the well went ahead to test Simpson which it also found dry. Lake City pool was opened by Pryor & Lockhart's Gant 1, Section 7-31s-13w, a small producer making 90 barrels of oil initial from 4438 feet in Viola lime.

Wildcat which is receiving considerable attention is Darrah et al's Decker 1, SWc SE 12-21s-2w, three miles northwest of production in the Graber pool of McPherson County. It had top of the Mississippi chat at 2971 feet and was rigging up standard tools before drilling in. The well was checking high on top of the chat.

Second producer for the recently opened Richards pool of Ellis County was brought in last week at Phil-Han Oil Company's Richards 1, SW SE NW 5-11s-18w. An offset to the discovery well, it had Kansas City lime at 3308 feet, ran casing to 3320 feet. After drilling through the first and second breaks in the lime to 3362 feet, the hole filled 2000 feet with oil. Additional production is expected from the third break in the formation toward which the test was drilling late in the week.

West Kansas Test Drilling In

An extreme western Kansas wildcat was preparing to drill to Siliceous lime after failing to find commercial production in Mississippi lime. The well is Phillips Petroleum Company's John Kees 1, SEc 3-19s-30w, 8 miles southwest of Dighton in Lane County. It was starting up at 4893 feet.

Carter Oil Company et al's Lytle 1, CNE NW 6-32s-14w, 6 miles southwest of Kees 1, and 10 miles northwest of Medicine Lodge pool in Barber County, was drilling below 4150 feet in Kansas City lime.

Stanolind Oil & Gas Company was running pipe to test Hahn 1, NEc NW 14-22s-13w, which may extend the Drach pool of Stafford County. The well is three-quarters of a mile west of the pool and had a good show of oil from 3753 to 3757 feet in Siliceous lime.

Three more interesting wildcats were written into Kansas drilling records last week. Two are in Barton County, each a half-mile from the Trapp South pool. Shell Petroleum Corporation's Margheim 2, NEc NW 12-16s-14w, was a location northwest of the pool, while the company's Sausen 2, NEc 13-16s-14w, was a location southeast. The tests will probably be defining wells, both being near dry holes.

In Cowley County, 2½ miles southeast of the Werner gas pool, Smith et al's Wilson 1, SE SW NW 9-33s-6e, was a location. The test will be carried to the Mississippi lime and is located on a block of 2000 acres.

Kansas operators completed 16 oil wells last week for 10,771 barrels of oil. One gas well made 75,000,000 cubic feet, and there were 12 dry holes.

First reports totaled 17 as against 30 for the preceding week and were distributed as follows: Russell, Stafford and Stevens counties, three each; Cowley and Ness, two each; and Butler, Harvey, Reno, and Rice counties, one each.

NORTH TEXAS FIELDS

Strawn sand wildcats near K-M-A core saturation.

* * *

Interval shortened between north flank producers.

* * *

Big producer extends field 1500 feet northwest.

Wichita Falls, Texas.—Recovery of oil saturated cores from Strawn horizon by wildcats near the K-M-A deep field commanded attention the past week.

V. A. Huff et al's C. F. Collins 1, about four miles west of Wichita Falls and 7½ miles east of the North Texas district's boom field, cored sandy-lime at 4232-36 feet, showing little oil saturation. Owners plan to cement pipe for a test. Top of lime was logged at 4167 feet, with an elevation of 1015 feet, indicating a lower and separate structural condition from the K-M-A field. Location is near the center of the east line of the J. T. Tyler Survey A-568.

Lewis Production Company's W. C. Frey 1, Block 17, Palo Pinto County School Lands, Archer County, two miles southwest of K-M-A deep production, was preparing to drill plugs and test late last week after coring oil saturated lime at 3973-75 feet. Top of lime was logged at 2826 feet, with an elevation of 1071 feet, the test being 76 feet lower on this marker than the nearest producer. Frey 1 is bottomed at 59 feet lower structurally than the water level established by one of the nearest producers.

Heyser, Heard & Clardy, Inc.'s Fassett-Tuttle 1, SWc SA&MG Section 3, A-267, north bank of the river, shortened the interval between producing wells on the northeast flank of the field, by showing for a commercial well after plugging off salt water at 4006-08 feet. Hole was plugged back to 4005 feet, with an elevation of 988 feet, and filled with oil. The well makes small heads when agitated. Owners have started a north offset. This outpost registered a low structural position in recording top of lime at 3814 feet.

North Extension Fails

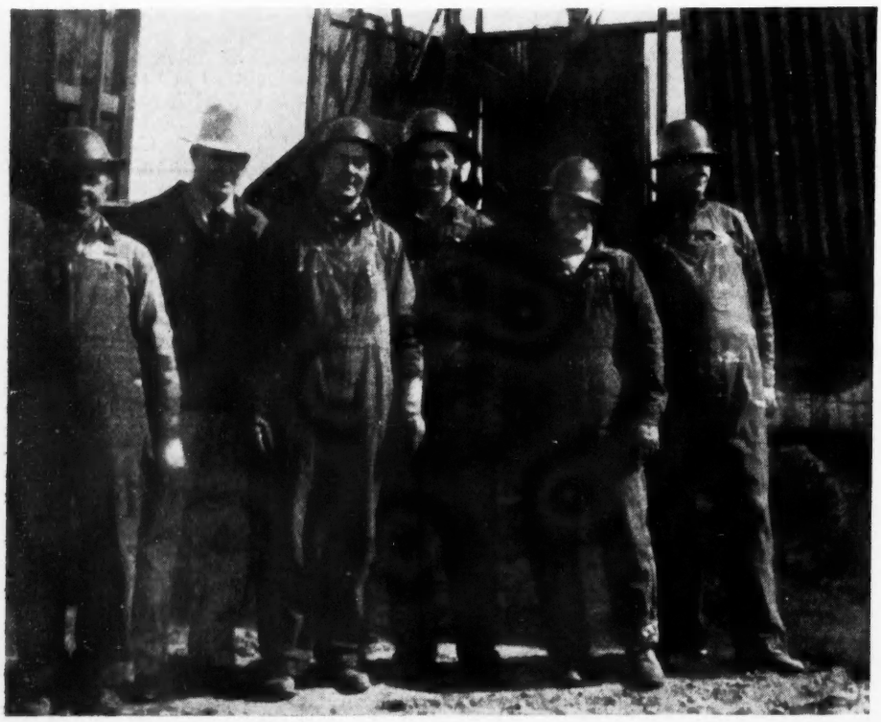
Efforts of King Oil Company, Perkins & Cullum et al to extend production to the north failed when their T. L. Burnett 1-D, NWc S½ SE Section 2, W. W. Carroll Survey, quit at 4232 feet in lime, with no saturation reported. Top of lime was called at 3672 feet, with an elevation of 1062 feet. Tom B. Medders et al's Edith Fields 1, SWc NE H&GN Section 32, A-415, three miles north and two miles west of Iowa Park, seven miles northeast of production, also checked high on structure in topping big lime at 3595 feet, or 2516 feet sub sea, and was drilling at 3650 feet.

Week's Largest

Outstanding completion of the week was credited to Consolidated Oil Company, Joe Howell et al's W. P. Ferguson 4, which flowed 1355 barrels oil in eight hours from broken pay at 3694-3810 feet. Top of lime was logged at 3635 feet, with an elevation of 1020 feet. This well extends production 1500 feet northwest from the westernmost group of producers. Pay zone was mostly sand.

Consecutive gains in field operations since mid-November have been temporarily halted as a sequel to the recent heavy rainfall and the overflowing of the Big Wichita River. Survey credits the field with 186 operations, including 67 tests in process of completion and those carried to the final casing point. Tests drilling with rotary below surface pipe and above the pay decreased from 55 to 44 the past week. Surface pipe has been cemented on 15 additional locations, and one idle test is listed. Only 7 new locations were added to field reports the past week, making a total of 43. Derricks and rigs account for 16 operations.

Peak level of drilling activity has not been reached. However, the quota of new



Outfitted with metal derbies as a safety measure, this rotary crew helped drill Magnolia Petroleum Company and Tex-Mex Petroleum Corporation's J. H. McKee 1-A, Pecos County Ordovician prospect. Drilling has been resumed after testing small volume of oil and gas at 5294 feet. Reading from left to right: Chas. Schmeltzer, engine man; Fitzhugh Lee Moore, tool foreman; Sam Edwards, driller; James Pace, derrick man; Olef Person, floor man; and Harry Poe, cathead man.

NORTH TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CLAY COUNTY—		
Bridwell Oil Co., Thornberry 3, blk 5	*	1159
Gant et al, Worsham 6, sec 37	1220	3942
COOKE COUNTY—		
Robinson et al, Otto 11-A, blk 5	47	884
JACK COUNTY—		
Danciger, Denman-S. M. Ivey 2	419	3237
Hammon & Herbert Oil Co., Rhodes 8	30	2314
MONTAGUE COUNTY—		
Beck et al, Davenport 21	15	2015
Continental, Maddox 32-A	25	891
Sinclair Prairie et al, Holt 22, blk 45	50	1669
WICHITA COUNTY (K-M-A)—		
J. A. Chapman-Ed. McFarlin, Waggoner Bros. 1-A, blk 26	580	3841
E. C. Oil Co., LeBus-Whitaker 3	1080	3844
Haberle & Thornton, First Nat'l Co. 1, blk 26	1400	3825
King Oil Co.-Perkins-Cullum, T. L. Burnett 1-D, sec 2	*	4232
Manson Oil Co., Mitchell 2, blk 10	1064	3917
Omohundro et al, Pace 1-B, lot 22	632	3850
Texas Co., First Nat'l Co. 23, blk 26	1016	3835
Wilson-Ligon & L. T. Burns, Munger 4, blk 31	936	3888
Wynne, Tr., Mitchell 1, lot 21	240	3981
WILBARGER COUNTY—		
Falls Ref. Co., Owens 1-a, sec 69	*	2247
YOUNG COUNTY—		
Bennett et al, Alberts 1, sec 3407	14	3598
Bohner et al, Prideaux 1	*	648
Labuzon et al, Self 1	*	750
Lion Oil Ref. Co., King-Wooten 1	800	3768
Sams & Watson, Cullers 3	9	583
R. W. Scott et al, Hawkins 1, sec 411	*	1100
Stuckey O&G Co., Jeffery 2, sec 52	*	898
Zweifel et al, Muller 1, sec 2374	12	4003

*Flowed; †Junked; ¶Million cu. ft. gas.

locations in the future probably will not surpass the high level attained in January and the fore part of February. Operators are becoming more conservative in their drilling plans, but will have continuous operations over a long period. New participants are following the completion of extension and connecting wells.

Revised proration schedule issued March 1 by the Railroad Commission lists 147 flowing and pumping wells in the Strawn zone, with an allowable of 7596 barrels daily. Top allowable for single wells on 20-acre units remains at 58 barrels daily, but units that have more than one producer are allowed only 43½ barrels daily for each of the extra wells. Imposition of this production penalty caused a few locations to be abandoned as it discourages close spacing of wells.

Unofficial estimates on the pumping capacity of Rathke Oil Company et al's T. L. Burnett-Gulf 1-A, 3¾-mile northwest extension that has been in process of completion for a month, rates the oil yield at 25 barrels daily. This outpost was drilled to Ellenberger water at 3738-39 feet, and shot after plugging back to 3692 feet. The above company's Throckmorton 1, a north offset was drilling at 2800 feet, with an elevation of 1138 feet. Clark-Cowden Drilling Corporation and Southwood Oil Company's W. T. Waggoner 1, south portion of A. Gibson Survey, A-455, 2¼ miles to the southwest, was drilling at 3470 feet, with an elevation of 1116 feet. F. W. Merrick, Inc., et al's W. T. Waggoner 1, northwest outpost, was due to resume operations to test for production in the upper Ellenberger, topped at 3745 feet, with water at 3802-14 feet. Hole was plugged back. It has an elevation of 1067 feet.

WEST CENTRAL TEXAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BROWN COUNTY—		
Hightower O&R Co., Mullin 1	*	2410
Indiana Oil Co., Moore 1	26	2474
Whitesides & Rogers, Moore 1	*	720
CALLAHAN COUNTY—		
Extension Oil Co, Boston 1	*	2004
C. B. Homes et al, Hughes 1	*	870
S. B. Owens et al, Ross 1	*	1793
Phillips, Cozart 1	*	4140
St. John et al, Dyer 1	*	3132
Woodley Pet. Co., Flores 1	15	4333
COMANCHE COUNTY—		
Dobbs et al, V. B. Hodges 1	500	2712
EASTLAND COUNTY—		
Dorothy Oil Co., Holcomb 1-A	¶1¾	1480
Kittrell et al, Reynolds 1	3	1105
MILLS COUNTY—		
Boyd & Bailey, Westbrook 1	*	2002
PALO PINTO COUNTY—		
Brazos River Gas Co., Costello 5	*	3252
King Oil Co., Lee 1	*	4685
E. Lloyd et al, McClure 1	*	1175
SHACKELFORD COUNTY—		
J. F. Baker et al, Davis 1	12	1584
Butler & Horn, Morris-Buie 18	15	1601
Charter O&G Co.-Pet. Producers Co., Davis 2	*	1714
Art Cox et al, Davis 1	*	1727
Hickok Prod. & Dev. Co.-Harry Reynolds, Davis 1	15	1573
Thos. D. Humphrey et al, Alston 1	*	3255
Hugh King Jr. et al, Davis-Walker 2	*	3965
Chas. J. Keliner et al, Morris-Buie 1	*	3303
Owens-Snebold Oil Corp., Ivy 3	*	2011
Roeser-Pendleton, Inc., Dawson 47, sec 202	41	1625
Tannehill et al, Matthews 39	*	1137

*Failures; †Junked; ¶Million cu. ft. gas.

WEST TEXAS FIELDS

Largest well improves Seminole's reserve rating.

★ ★ ★

Seaboard test may provide major Ogden extension.

Midland, Texas. — Seminole pool, Gaines County, improved its rating as a source of oil production in recording its largest producer. Ohio Oil Company's Averitt 2, one location southwest of production, gauged 953 barrels of oil after using 2000 gallons of acid in lime at 5030-89 feet, flowing through open tubing. This outpost missed the big gas found near the oil contact in the 5 previous completions and the gas yield was estimated at a quarter million feet daily.

Development of this area has been restricted due to the absence of pipe line outlet. It was proved for oil production in November, 1936. Amerada Petroleum Corporation's Robertson 1, one mile east extension, is the first attempt to broaden the producing area, and is showing for a small well at 5112 feet while trying to sidetrack tools.

Andrews County gained a new wildcat project on University Lands in the Shafter Lake area, where large bonuses have been paid in recent years for leases, and has a prospective wildcat producer or extension to the Ogden field. Seaboard Oil Corporation's Munger-Nix 1, C NE PSL Section 1, Block A-41 3¾ miles southwest of the latter area, has cemented pipe at 4308 feet to test several saturated zones logged in drilling to 4526 feet. Walter J. Donnelly et al are rigging up rotary after landing surface pipe on University 1, C NW SE Section 16, Block 14. Location is north of the lake and 6½ miles north of the Ogden field, with a recent dry hole separating the latter.

Roger & Rogers' Holt-Sun 1, near the south line of Andrews County and a northeast outpost for the North Cowden field, swabs about 50 barrels of fluid daily, estimated 75 percent oil, from lime at 4541 feet. It has not been acidized or shot.

Slaughter Extension

Sid Richardson et al's Slaughter 1, two-mile north extension for Slaughter pool, Hockley County, gauged 434 barrels of oil initially through tubing choke at 4994 feet. It was shot mid-February with nitro in lime at 4895-4989 feet. Gulf Oil Corporation is drilling below the final casing point on southeast and southwest outposts for this new North Permian basin area. L. E. Hults et al have contracted to drill Ross-Gulf 1, SWc NW C&M Section 6, Block D-14, Terry County, about 3½ miles south of nearest production.

Shell Petroleum Corporation's Baumgart 1-C, east outpost for the Yoakum County portion of the Wasson field, flowed 220 barrels initial through open tubing after a 600-quart nitro shot in lime at 4810-5018 feet. It has an elevation of 3580 feet.

WEST TEXAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CRANE COUNTY (Jordan)—		
Texas Co., University 2-A	430	3585
CRANE COUNTY (McCamey)—		
Quality Prd. Co., Howard-Gibbs 2	324	2324
CULBERSON COUNTY—		
Brewer, Collins et al, Caldwell 1	*	2352
ECTOR COUNTY (Goldsmith)—		
Atlantic, Slator 5	143	4303
T. P. Land Trust 3-C	619	4285
T. P. C&O Co., Scharbauer 16	1232	4270
ECTOR COUNTY (Harper)—		
Continental, T. P. Land Trust 1-27	624	4230
Mid-Continent, Cowden 1	1089	4228
Oil Well Drl. Co., Cowden 2-B	719	4241
ECTOR COUNTY (North Cowden)—		
Sinclair Prairie, Wight 4	752	4212
Stanolind, Cowden 69	510	4218
ECTOR COUNTY (South Cowden)—		
Bond Oil Corp.-Harrison, Addis 3	135	4070
FISHER COUNTY (Rotan)—		
Montour Prod. Co., E. Smith 3	272	3563
GAINES COUNTY (Seminole)—		
Ohio, Averitt 2	953	5089
HOCKLEY COUNTY (Slaughter)—		
Richardson et al, Slaughter 1	1000	4994
HOWARD COUNTY—		
S. A. Cosden-Cosden & Kahn, O'Daniel 1	305	2848
Iron Mountain Oil Co., Snyder 3	619	2905
Magnolia, Roberts 23	1263	2573
Ward Oil Corp., Roberts 28	1276	2954
JONES COUNTY—		
Grisham-Hunter Corp., Appling 1	*	4605
Haterius, Ungren & Frazier (was Oil States Explo. Co.), Olson 1	*	5269
Iron Mt. Oil Co.-Hamble Haterius 2	5000	3268
Olander 2	3000	3202
Jones et al, Neas 1	322	1979
King Oil Co., Carter 2	650	1946
Lewis Prod. Co., Rutledge 2	*	1927
Sayles 11	123	1976
Petroleum Prod. Co., Millsap 3	440	1955
Roeser & Pendleton, Fee 1	*	3877
Ungren & Frazier, H. Dorsey 3-E	175	2610
PECOS COUNTY (Wildcat)—		
Cardinal Oil Co., White-Baker 1-36	†	453
TAYLOR COUNTY—		
A. Findley et al, Bowles 1	8	2121
UPTON COUNTY (McCamey)—		
Basin Oil Properties, Baker-Conoco 5-A	1081	2382
Homestead O&G Co., Hughes-Pure 9	943	2770
Shell, Burleson 1	242	2373
WARD COUNTY—		
C. W. Clark-A. T. Donnelly, Wathen-Sun 2	28	2295
Gulf, Estes 77	662	2690
Hutchings 97	762	2760
P. C. & F. Oil Co., Nitterberg 1	*	2360
WINKLER COUNTY (Kermit)—		
Gulf, Clapp 26	¶6¼	3090
Clapp 28	507	3105
YOAKUM COUNTY (Bennett) —		
Honolulu Oil Corp., Bennett 3	998	5249
Mid-Continent, Bennett 1	1424	5240
YOAKUM COUNTY (Wasson)—		
Texas Co., Willard 2	253	5085

*Failures; †Junked; ¶Million cu. ft. gas.

EAST TEXAS

Wildcat writes new chapter in Woodbine basin geology.

* * *

Talco north edge Trinity test scores encouragement.

Tyler.—A new chapter in the geological history of East Texas Woodbine basin has been provided by Stanolind Oil & Gas Company and Ramsey Petroleum Corporation's Tennie Norris 1 in penetrating 655 feet of salt while exploring the Thornton faulted structure, Limestone County, to a depth of 9650 feet. Presence of the thick body of salt has aroused considerable attention in geological circles, and the profession is curious to learn the identity of formations below the salt beds. Adequate drill pipe has been moved in to drill Norris 1 below the 10,000-foot level. Drilling time in the salt zone averages 10 to 20 feet per hour.

Salt beds below the Lower Marine and dolomite lime have been reached by comparatively few tests in southern Arkansas and north Louisiana. Norris 1 is the first to drill to the zone in the East Texas Woodbine belt. R. W. Norton's Payne 1, SE SE 27-23n-16w, Louisiana portion of the Rodessa field, penetrated 16 feet into the salt beds in drilling to 11,486 feet last August.

May Call Geophysics

The Thornton fault project recorded nominal oil saturation at intervals in the lower Trinity series, and also in the Reynolds, or Snowhill lime logged at 8525-8995 feet. This lime zone was topped at 8763 feet by Pure Oil Company's recently completed deep test on the Mexia fault, Limestone County, but the hole was junked at 8847 feet.

Condensed log of Norris 1 below the Upper Cretaceous follows:

Elevation	528 -
Georgetown	3255-
Paluxy	3955-
1st. Glen Rose	4060-4886
1st anhydrite	4886-
Base anhydrite	4894-
2nd Glen Rose	4894-5375
Top Pettit	5375-
Travis Peak	5528-7595
Lower Marine	7595-8525
Reynolds lime	8525-8995
Salt	8995-????

Finding of the salt bed in the basin may soon open a new era in the use of geophysical instruments for detecting structural conditions. The salt affords an excellent zone for checking, and a series of test shots are slated to be made around the well site.

Exploration of the lower Trinity series on the north edge of the Talco field, Franklin County, scored some encouragement for production when Ajo Oil Corporation et al's Sanders 1 showed 85 feet of drilling fluid and five feet of 26.7 gravity oil when a formation tester was used at 5388-5417 feet. A core pulled in lower Glen Rose at 5462-75 feet, with an elevation of 365 feet, contained a little oil saturation. Operations were halted at this depth to run an electrical formation surveying instrument, and later make a drill-stem test. Contract calls for a 5900-foot test. Sanders 1 was originally a Paluxy test, but because of being north of the fault missed the entire section, and in deepening passed to the upthrow side of the fault at 4575 feet.

Negotiations have been started to finance a test to the lower Marine on the Kelsey dome, Upshur County, when Tom Hunter and American Liberty Oil Company's Carter 1, which is drilling at 7765 feet, fulfills its original depth contract. Acreage sales and dry hole contributions call for a 9000-foot depth, or 400 feet in the Travis Peak, which was topped at 7480 feet, with an elevation of 428 feet.

Flag Lake enhanced by large flowing well

Tyler.—Completion of a second producer on the Flag Lake faulted structure, northwestern Henderson County, enhanced the oil prospects by registering a prolific flow of high gravity oil from the Woodbine. Harry Hines, J. D. Hancock et al's A. R. Dillard-Shell 1, south offset to the discovery, flowed 417 barrels of 44 gravity oil in 3¼ hours through various size chokes while running tubing. Production is from sand at 3070-76 feet, with an elevation of 352 feet. The discovery drilled by Sherman Hunt, DeArman and McMillan on the Dillard tract was completed November 18, 1937, flowing 128 barrels initial through 3/16-inch choke from Woodbine at 3095-3105 feet, after plugging back from 6518 feet.

It has an elevation of 361 feet. The latter group's Dawdy-Texas Co. 1, a northeast offset, recently tested water in Woodbine at 3100-3105 feet.

Previous Woodbine failures in the Flag Lake area tend to restrict the potential producing area to a narrow strip, extending in a northeast to southwest direction along the course of the Mexia-Talco fault plane. The length of the field remains to be determined, but it is not considered adequate to support a major drilling program. Due to the thin pay section logged by the discovery, majors have elected to farm out a portion of their close-in leases. No pipe line connection is available, and will not be provided until the prorated allowable justifies the expenditure.

Tyler, Texas.—Stanolind Oil & Gas Company and Ramsey Petroleum Company's Norris 1, Thornton area, Limestone County, logged base of salt at 9785 feet after recording a 790-foot section, and was drilling at 9840 feet. At the latter depth the test was in broken anhydrite and shale.

East Texas allowable to pass half million

Kilgore.—Allowable production of the East Texas field will again pass the 500,000-barrel level by mid-March, although the actual daily average will be under this figure because of the enforcement of the Sunday shutdowns during the remainder of the month.

The field was credited with an allowable of 498,327 barrels from 24,635 wells on March 1, according to Railroad Commission's records. Production has been attaining higher levels daily through the addition of an unusually large number of completions, and will reach the half billion mark upon the completion of 83 new producers.

Preliminary figures indicate that 173 new wells were recorded during the short month of February, and 178 the previous month. During January, 1937, the field added 144 wells and 142 in February. Drilling of inside locations is being pushed with greater effort than for the same period last year. Currently there are 74 rigs in service, with a total of 132 field operations.

Policy of the Commission in granting well spacing exceptions regardless of the density of a given lease has been protested and opposed with costly court attacks.

The courts failed to provide relief for operators seeking to maintain a reasonable density, leaving no recourse but to appear in person else hire influential attorneys to attend permit hearings at Austin and resist applications involving offset leases.

Recent issuance of a permit for the drilling of a well on a site embracing about one-tenth of an acre adjoining Rowan &

TEXAS PANHANDLE AREA

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
GRAY COUNTY—		
Cambrian Oil Co., Barrett 8	262	3280
Cities Service, Noel 6	650	3275
Walberg-Hood 6	565	3085
H. Stekoll Oil Co., Combs-Worley-Conoco 2-A	*	3160
HUTCHINSON COUNTY—		
Cree-Hoover & F. W. Dye, Harvey 2	632	3041
Gulf & Panhandle Ref. Co., C. L. Dial 78	420	3025
Magnolia, SW Oil & Dev. Co. 1	464	3147
Smith Bros. Ref. Co., Hodges 2	633	3091
Harry Stekoll & F. W. Dye, Carver-Whittenburg 1	¶43	3367

*Failures; †Junked; ¶Million cu. ft. gas.

Nichols Oil Company's B. C. Todd 25-acre lease, W. H. Castleberry Survey, Longview area, may prove embarrassing to the commission. Nearby property owners entered firm protest against the application, but were overruled. Rowan & Nichols Oil Company has retaliated by making formal application for 19 well permits for its 25-acre lease, which has 6 flowing wells, or a density of one well per acre. Hearing has been set for March 11 at Austin.

Leases having more than one well with an average density of less than one acre per well are commonplace at various points in the field. F. W. Fischer, Tyler attorney who successfully voided earlier proration regulations with court attacks, holds somewhat of a field record for well density on small sites in the London district. Ambassador Oil Company is a runerup in the area. Henry Oil Company strengthened its record for density in the Kilgore area by completing its eleventh flowing well on the S. S. Laird 8-acre lease on February 24.

Southeast extension looms for Turkey Creek.

* * *

6300-foot zone opened in south end of Stratton.

* * *

Fourth sand discovered in South Clara Driscoll.

EAST TEXAS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
JOINER AREA—		
Ambassador Oil Corp., London School 10 (3.33-ac)	7300	3740
Atlantic, Young 7-F (27½-ac)	5400	3767
Bond Oil Corp., Maxwell 3 (4.27-ac)	7000	3749
Champlin & Bass, Alford 5 (6.95-ac)	4200	3781
Duo Oil Corp., Thrash 5-A (9-ac)	3000	3692
East Shore Oil Co., Fox 11 (40-ac)	6200	3680
Granite Oil Trust, Young 2-S (5½-ac)	5500	3720
Humble, Florey 11 (79½-ac)	9000	3693
Mullikin 23 (166.4-ac)	7200	3704
Thrash 7 (42.04-ac)	7000	3785
Marko O&G Co., Lacy 9 (90.36-ac)	500	3654
Normandie Oil Corp., Keeling 3 (8.91-ac)	4500	3760
Ohio, Cross 86 (814.54-ac)	2000	3648
Powers & Kline, Lee 7 (37.7-ac)	500	3653
Sinclair Prairie, Patterson 17 (164.67-ac)	960	4003
Stanolind, O'Quinn 12 (80.35-ac)	4600	3789
Sun, Pace 38-B (637.45-ac)	*	3729
Texas Gulf Pet. Co., Stone-Mid-Continent 1	*	3740
Tide Water Associated, Thompson 12-A (74.71-ac)	5500	3717
Ward Oil Corp., Thrash 38 (200-ac)	5400	3817
KILGORE AREA—		
Bullard et al, Still 1-B (4.27-ac)	60	3550
Still 2-B (4.27-ac)	80	3550
Geier Bros.-F. B. Jackson, Williamson 7 (100-ac)	500	3681
Gen'l American Oil Co., Smith 13 (45-ac)	8000	3585
Gen'l Crude Oil Co., Scott 13 (37½-ac)	6400	3648
Gulf, Brightwell 11 (50-ac)	4000	3600
Nichols 11 (48.1-ac)	3500	3690
Humble, Laird 91-B (568.53-ac)	4500	3635
Laird 92-B (568.53-ac)	4300	3627
R. E. Kennedy-E. J. Gray, Adams-Hale 1, blk 120	2800	3578
Magnolia, Radford 13 (75.50-ac)	8800	3634
Miller et al, Laird 4-B (2½-ac)	4000	3580
Nat'l Oil Co., McCullough, Rec., L. Martin 4-A (20-ac)	3600	3707
Overton Ref. Co., G. H. Morris 5 (26½-ac)	240	3628
Pearce et al, Shaw 3-S (1-ac)	2500	3545
Rancho Oil Co., Crim 5 (1.3-ac)	2000	3574
Sun, Morton 31 (336.24-ac)	*	3540
Tide Water Associated, Blackman 19 (80.86-ac)	3200	3651
Hughey 35 (200-ac)	2400	3500
LONGVIEW AREA—		
Dean Bros. et al, Victory 11 (30.29-ac)	2000	3615
R. H. Dearing-L. C. McBride, Chapel 6 (15-ac)	1500	3625
Ellis Oil Co., Mackey-Humble 23 (147.1-ac)	750	3723
Galvez Oil Corp., Sheppard 9 (36-ac)	8300	3580
Gen'l American Oil Co., Wells 16 (51.4-ac)	6000	3715
Humble, Hughes 46 (245.6-ac)	3600	3625
Iowa Payne Oil Co., Akin 6 (20-ac)	8700	3602
Johnston et al, Williams 10 (88-ac)	1200	3706

Corpus Christi.—New sands were opened in the Stratton and South Clara Driscoll fields, while Turkey Creek was extended more than one-half mile southeast to feature Nueces County wildcatting activity. At the same time, marine drilling operations in the county were increased to four.

C. Andrade III et al's John Dunn 1, Section 422, 2600 feet southeast of the Turkey Creek, is in final stages of completion, having drilled to 5832 feet in sand topped at 5792 feet. Pipe was landed on bottom and perforations have been made for completion. The lower portion of the sand showed salt water.

Camp Production Company's C. P. Wardner 4, Section 16, at the south end of the Stratton field, flowed 163 barrels of 54 gravity straw colored oil in 24 hours through ¼-inch choke to open the 6300-foot zone in this area. The well registered pressures of 1900 pounds on tubing and 1975 pounds on casing. It cored a sand body from 6273 feet to 6300 feet and pipe was landed atop the sand. This is the first producer drilled by the concern in this field where the wells spread over an area 8600 feet long and about 2500 feet wide. Four sands have been developed, and in virtually every case the wells have been drilled deep enough to show the various sand bodies to be general over the structure.

Company, Well and Location	Init. Prod. Bbls.	Depth
Magnolia, Todd-Stinchcomb 18 (111-ac)	9400	3570
Margay Oil Corp., Christian 9-B (16-ac)	8900	3675
Pickens et al, Wells 14 (40-ac)	3500	3716
Sinclair Prairie, Lawson 22 (84.19-ac)	8500	3606
Stanolind, Hineman 12 (46.27-ac)	8600	3705
Lathrop 30-B (114.8-ac)	3500	3623
Sun-Seaboard, Haynes 41 (203-ac)	7600	3674
Tide Water Associated, Castleberry 30 (202-ac)	3000	3581
Turner et al, Jones 14 (63.84-ac)	8500	3638
ANDERSON COUNTY (Long Lake)—		
F-H-E Oil Co.-Fleming-Kimbell Corp., J. H. Morrow 2-A (50-ac)	¶115	5369
Hunt Oil Co., W. J. Moore 1 (160.65-ac)	76	5301
FRANKLIN COUNTY (Talco)—		
Humble, Stuart 3 (35.01-ac)	184	4288
Magnolia & Humble, Maxton 7 (326½-ac)	*	4368
Owings 13 (79½-ac)	260	4312
HENDERSON COUNTY (Flag Lake)—		
Harry Hines & J. D. Hancock, Dillard-Shell 1 (175-ac)	3000	3076
TITUS COUNTY (Talco)—		
Humble, Batson 8 (144.27-ac)	521	4325
VAN ZANDT COUNTY (Van)—		
Humble-Pure, Listenbee 3 (30-ac)	*	1307
MARION COUNTY (Rodessa)—		
Phillips, Lockett 1, U. Ewing sur.	480	6170

*Failures; †Junked; ¶Million cu. ft. gas.

Building Line

Camp Export Company, a unit of the above concern, is building a four-inch pipe line from the field to Bishop, eight miles. It is planned to ship the crude from Bishop via railroad, but later the line will be extended to Corpus Christi or tied into a present line.

Wellington Oil Company and Seaboard Oil Corporation have uncovered a fourth new oil sand in the South Clara Driscoll field of Nueces County with L. M. Dugger 2. The test missed the regular 3800-foot zone, but found sand at 4648-59 feet, another 4736-55 feet, still another at 5076-90 feet. The newest is at 5289-5305 feet, where a drill stem test, seat at 5294 feet, recovered 1200 feet of pipe line oil, 53 pounds working pressure and no water in 15 minutes through ⅜-inch chokes, top and bottom. It is drilling in search of lower zones. Only one producer has been completed in the field, that being the discovery.

Marine drilling continues to hold much attention in the area. Humble Oil & Refining Company has spudded its first test in Laguna Madre on state lands in the Flour Bluff field, while Sinclair Prairie Oil Company has commenced two in the same field. Coastline Oil Company is about ready to spud a deep wildcat near Red Fish bay in this county, while just across the line into Kleberg County, Pure Oil Company et al, are starting their deep wildcat in Laguna Madre.

Alfred Discovery Flows

Potential test on Rowan and Hope, Inc.'s Robert Adams 1, discovery well of the new Alfred Frio sand field in Jim Wells County, rates the test at 206 barrels of pipe line oil per day through 3/16 inch choke. The test, flowing 47.3 gravity oil, showed pressures of 430 pounds on tubing and 450 pounds on casing. It was completed through perforations at 3224-29 feet. A second well has been commenced by this concern in the southwest corner of the 40-acre drill site. About ¾ mile southwest, Sacultrab Oil Corporation acquired 700 acres of Adams land and shortly will commence drilling.

H. H. Howell's second attempt to de-

velop production in the area southwest of Alice in Jim Wells County seems to be of little avail. Goldapp 1, testing through a series of perforations reported to be starting just below 3300 feet and continuing to the bottom of the hole at 3634 feet is flowing oil, salt water and gas, mainly the latter. It is waiting on orders, but likely will be reworked.

To Drill Plugs

Magnolia Petroleum Company is preparing to drill plugs and test A. A. Seligson 8, second well and 1271 feet north of the discovery of the East Premont area of Jim Wells County. The well is bottomed at 6155 feet with 9⅝-inch casing landed at 6140 feet. It has not been announced whether or not this well will be carried to the 6500-foot level where the first well is producing. Seeligson 8, however, encountered the same high pressure gas and distillate sands found in the discovery, hence, it is likely that the 9⅝-string is mainly for protection.

Jackson County gained considerable attention through a Miocene sand showing in Henry C. Adams et al's J. W. Foust et al. The well, in P. White survey, seven miles north of Edna, cored sand with oil show from 2650-65 feet and water to 2667 feet. It developed a little pressure, 200 feet oily sand and 70 feet of drilling mud in two minutes. The test, at last reports, was below 3500 feet on its contract and will be again tested at the upper level should lower sands fail to produce. This well is being drilled on a prospect farmed out by Gulf Oil Corporation.

Oldest field in Mirando district gets spotlight

Laredo.—Mirando district's first oil field assumed the spotlight of attention during the week with a deeper sand being uncovered. Mirando Valley, northeastern Zapata County, was discovered 17 years ago, but it was not until last week that deeper exploration netted anything promising.

Burt Clavin's Rufino Lopez 1, NW Section 253, and just east of production, cored an oil sand at 1873-81 feet which on a drill stem test of 7 minutes duration through ¼-inch chokes, top and bottom, recovered 200 feet of oil and 35 pounds pressure. The oil is 22 gravity. Casing was landed on top of the sand and late this week, production test was being attempted.

This field was opened by O. W. Killam's Hinnant 2, which on April 17, 1921, flowed 40 barrels of 21 gravity oil per day from sand at 1416-23 feet. The field proved rather small, recovering less than 650,000 barrels of crude to date. The discovery, however, was of tremendous importance, as it was the forerunner to the Mirando district's development program, which now has some 50,000 productive acres and approximately 6000 producing oil wells. Likewise, O. W. Killam has drilled in excess of 1000 wells in the territory, developing about a dozen fields.

The new discovery is believed to be in the basal Jackson, possibly the O'Hern or Pettus sand at the top of the Cockfield. The structural situation is of sufficient importance to suggest that an extensive program will prevail.

North Sweden Defined

North Sweden field, Duval County, was defined to the south by C. Pete Burton's Southland Life Insurance Company 2, Section 12, which was abandoned at 5600 feet. It either lensed out sands in the upper section or showed salt water. In the lower section, it cored oil sand at 5504½-12 feet and sandy shale at 5512½-22 feet. Two drill stem tests showed only a slight pressure and some oil cut mud, considered insufficient to indicate oil production.

Maetze test has three sands in Frio-Vicksburg

Beeville.—Development of the Maetze gas field of Goliad County into an oil producing area appears more promising with H. J. DeArman and Winward Oil Company finding three sands in the Frio-Vicksburg zone carrying good shows. O. G. Drier 1, BS&F Survey No. 7, 2250 feet northeast of the single wet gasser in the field, found its latest sand at 3806-15 feet. A drill stem test was made with seat at 3803 feet, 2 gallons of oily mud and 400 pounds pressure being recovered through ¼-inch chokes, top and bottom, in five minutes. The tool apparently slipped and a second test was made.

The test found a sand at 3395-3408 feet with oil show, then another at 3603-27 feet showing gas followed by one 3627-37 feet with good oil show. A drill stem test at 3596-3637 feet developed 100 pounds pressure in 6½ minutes, which built up to 180 pounds at the end of 10 minutes. The test, through ¼-inch chokes, top and bottom, recovered 335 feet of salt water with 150 feet of mud carrying oil odor. A second test at 3632-37 feet through ¼-inch chokes, top and bottom, recovered 1020 feet of salt water, 10 feet of mud and a good gas blow in 10 minutes.

J. B. Chew and Hantho-Nelson, Inc., were drilling ahead to the 5400-foot contract depth after failing on several completion attempts to open Pettus sand production at 5058-76 feet in J. McNeill Bell 1, Live Oak County wildcat.

Samfordyce gas well may be in new sand

Mission—What appears to be a new sand at the top of the Vicksburg, has resulted in Samfordyce through completion of a gasser in H. J. Porter et al's A. Flores 3, in the northwestern portion of the producing area. The well is bottomed at 3364 feet, with casing landed at 3240 feet. The hole was plugged back to 3206 feet and perforated at 3183-89 feet, sand having been logged 3183-96 feet. Pressure on the test was 1150 pounds on the casing after being shut in. This corresponds closely to a gas sand productive on the northeast side of the field.

Oilton-Killam hearing

Austin.—A dividing line between the Oilton and Killam fields in Webb County was sought at a hearing before the Texas Railroad Commission last week. O. W. Killam, who owns most of the field named for him, asked that Oilton rules be limited to the area where the Oilton sand is producing.

The Mountain Townsite Company, which owns virtually all leases in the town of Oilton, sought to extend the limits of the Oilton field in order to prevent concentrated drilling around townsite limits.

SOUTH TEXAS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
LAREDO DISTRICT		
DUVAL COUNTY—		
Benedum & Trees, Puig 11 (N. Sweden)	650	4783
Burton, Southland 2 (N. Sweden)	*	5538
Cox & Hamon, Cuellar-Hagan 1 (Hoffman)	30	2823
Culton, Sutherland 1, sec 188	*	2691
Duval, Ruiz 7 (Hoffman)	100	2740
Government Wells, Lundell 16 (Lundell)	215	1507
Hiawatha, Parr 8 (N. Sweden)	550	4767
Magnolia, Duval Ranch 1, sur 196	*	3128
Labbe 14 (Labbe)	*	2878
Republic, Buoy 4 (N. Sweden)	*	lcn.
Buoy 5 (N. Sweden)	400	4786
Reynosa, Welder 1 (Seven Sisters)	450	2641
Standard of Kansas, Rossi A-2 (N. Sweden)	350	5358
Woodley & Moran, West 2 (N. Sweden)	550	5369
JIM HOGG COUNTY—		
Stephens, Gruy 1, Kohler subd	*	3504
McMULLEN COUNTY—		
Jones, Ezzell 6-B (Ezzell)	85	1482
Ezzell 7-B (Ezzell)	175	1464
Ezzell F-3 (Ezzell)	30	1544
Loma, Fuchs 1, Garner sur	*	1265
Magnolia, Edrington 1, sur 85	*	3442
STARR COUNTY—		
Dodd, Wardner 1, por 84	*	1535
Graham, Yturria 2, por 100	150	3059
Porter, Flores 3 (Samfordyce) (perf in sand 3183-96)	¶15	3365
WEBB COUNTY—		
Bailey-Bailey-Thorman, Garcia 1-B (Killam)	*	2116
Boysen & Jones, Watkins 1, sec 20	*	4209
Davidson, Aguilar 1, sur 472	*	202
Killam, Garcia 36 (Killam) (perf 1989-95)	100	2575
ZAPATA COUNTY—		
Killam, Rodriguez 1, sh 12	*	1200
BEXAR COUNTY—		
Fair, Hatch 1, blk 52	3	1190
Hamill & Hamill, Brietzke 1, Rodriguez sur	*	1800
CALDWELL COUNTY—		
Adams, Teas 1, Miller sur	*	2392
Baker-Freeman, Canady 1 (Branyon)	*	2630
Brady & Pummel, Jackson 1 (Salt Flats)	30	2680
Grayburg, Hardeman 7 (Luling)	10	2077
Magnolia, Gideon B-2 (Luling)	80	2193
Ogden, Lackey B-2 (West Dale)	55	2662
Spokane-Oklahoma, Putnam-Hibbits 3 (Luling)	*	2278
MEDINA COUNTY—		
Wagener, Medina A-22 (Chicon Lake)	*	203
TRAVIS COUNTY—		
LaShelle & Gardner, Giles 1, Sanders sur	*	728
UVALDE COUNTY—		
Wilcox, Morris 1, sur 380	*	3091
JIM WELLS COUNTY—		
Rowan and Hope, Adams 1 (Alfred)	500	5009
KARNES COUNTY—		
Randon, Radford 1, Martinez sur	*	3846
LIVEOAK COUNTY—		
Bleak Hill, Viteri 2 (Ezzell)	500	1530
Viteri 3 (Ezzell)	75	1529
Parr, Brannon 1, sur 45	*	4509
Southwest, Hill 7 (Ezzell)	128	1532
Hill 8 (Ezzell)	100	1520
Whittington, Simmons 1 (Ezzell)	*	1680
NUECES COUNTY—		
Camp, Wardner 4 (Stratton)	25	6300
Magnolia, Eagle Lake 1 (Flour Bluff)	*	6745
Renwar, McKenzie 2 (Turkey Creek)	500	5831
Richardson, Erwin 1 (Saxet Heights)	*	5205
Quiroz 15 (Saxet) (perf 6275-80)	250	6417
Rutherford, Stewart 1, sur 418	*	7224
Seaboard, Luby 8 (Luby)	500	5068
Luby 12 (Luby)	500	5068
Shaffer 5 (Luby)	500	5078
Stanolind, McCann 5 (Luby)	300	5065
Temple, Singer 1, sur 421	*	6757
Western Gulf, Isensee 6 (Saxet) (perf 4723-28)	600	5026
REFUGIO COUNTY—		
Quintana, Reilly 6 (Greta-Tomoconnor) (perf 5510-15)	1500	5975
Union, Fox 21 (Fox)	350	5882
Lambert 69 (Greta-Tomoconnor)	500	6050
SAN PATRICIO COUNTY—		
Plymouth, Brigham 1 (E. White Point)	625	5665
VICTORIA COUNTY—		
Barnsdall, McFaddin 5 (McFaddin)	400	4398
Barnsdall & American Liberty, Pickering-Roos 26 (Placedo)	*	6310
Echols, Lander 4 (Heyser)	600	6038
Edwards, Robertson 1 (East Telferner) (perf 5110-14)	300	5633
Superior & Gillespie, Mahon & Buehler 1, Valley Ditch sur	*	4510

*Failures; †Junked; ¶Million cu. ft. gas.

TEXAS GULF COAST

Wildcat mile south of McCrosky prepares to test.

* * *

Fairbanks extension attempt picks up gas sand.

* * *

Orange northwest outpost hits salt water and quits.

Houston. — Superior Drilling Company's Paul Kruger 1, one mile south of the discovery well at McCrosky, north of Van Vleck, C. Warren Survey, Matagorda County, was preparing to make a drill-stem test last week although it is low on markers as compared to the discovery well. Kruger 1 was cored to 6703 feet in sand showing oil. A slight showing of oil was logged from 6683 to 6698 feet and then a sand from 6698 to 6703 feet. An attempted drill-stem test failed. It did not show anything of real importance when the testing tool was recovered from the hole.

Hungford Gets Test

A new wildcat location was announced in the Hungford area of Wharton County last week. H. C. Cockburn and Temple Hargrove made location for Hudgins 1, 1000 feet north 17 degrees west and 1150 feet south 73 degrees west from the southeast corner of Hudgins 603-acre tract, or approximately 7700 feet southeast of the northwest line and 1100 feet southwest of the northeast line of M. Muldoon Survey.

One mile northwest of Friendswood, Harris County, H. C. Cockburn abandoned Fee 1, W. K. Smith Survey, at 6315 feet after failing to pick up the Frio producing sand. The well was considered low on geological markers. It is reported Cockburn will announce another location in the area.

Humble Oil & Refining Company completed three new producers at Friendswood last week. Roberts 1 made 27 barrels per hour throug a ¼-inch choke at 6041 feet, Keisling & Dixon 3 made 25 barrels per hour at 6048 feet and Settegast 2 was completed at 6040 feet making 600 barrels daily. Humble's Beamer 5 will be completed next week in Frio sand.

Low on Structure

North and east of the discovery well at Fairbanks, Harris County, E. L. Smith & Owenby Drilling Company's Myers 1, G. Ayers Survey, was coring for the oil sand at 6774 feet. The well logged gas sand from 6758 to 6774 feet, but is reported to be running low on structure as compared to the discovery well. However, with the showing of gas at 6758 feet the well indicates it has a good chance to pick up oil sand.

Two new wildcat locations were announced in Harris County last week. A. Harris made location for Baker Estate 1, east of Cypress, 2300 feet east of the west line and 990 feet north of the south line of the Baker 400-acre tract in the A. Bodin Survey. It is near the Mt. Houston prospect. O. W. Killam's Sweeney Estate 1, is 330 feet west and 330 feet north of the southwest corner of a 320-acre tract in the G. Williams Survey, east of the Ogburn Survey.

Gulf Oil Corporation completed two new oil producers on the Southwest side of Orange, Orange County, in the new deep Frio sand. Thompson and Ryan's Norwood 1, 2500 feet northwest of the discovery well, Wm. Dyson Survey was abandoned at 6479 feet. Gulf's F. Granger of the discovery well, Wm. Dyson Survey was at 6479 feet. Gulf's F. Granger 1 made 650 barrels daily through a ¼-inch choke with a tubing pressure of 850 pounds and a casing pressure of 1000 pounds from Frio sands at 5959 feet. Top of the sand was logged at 5937 feet and seven-inch casing was set at 5934 feet. Gulf's C. Granger 1 made 665 barrels daily through a ¼-inch choke, with a tubing pressure of 960 pounds and a casing pressure of 1000 pounds at 5927 feet. Top of the sand was encountered at 5918 feet and seven-inch casing was set at 5907 feet. Norwood 1 cored salt water sand off the structure at 6479 feet, but Thompson and Ryan will move in for a new well.

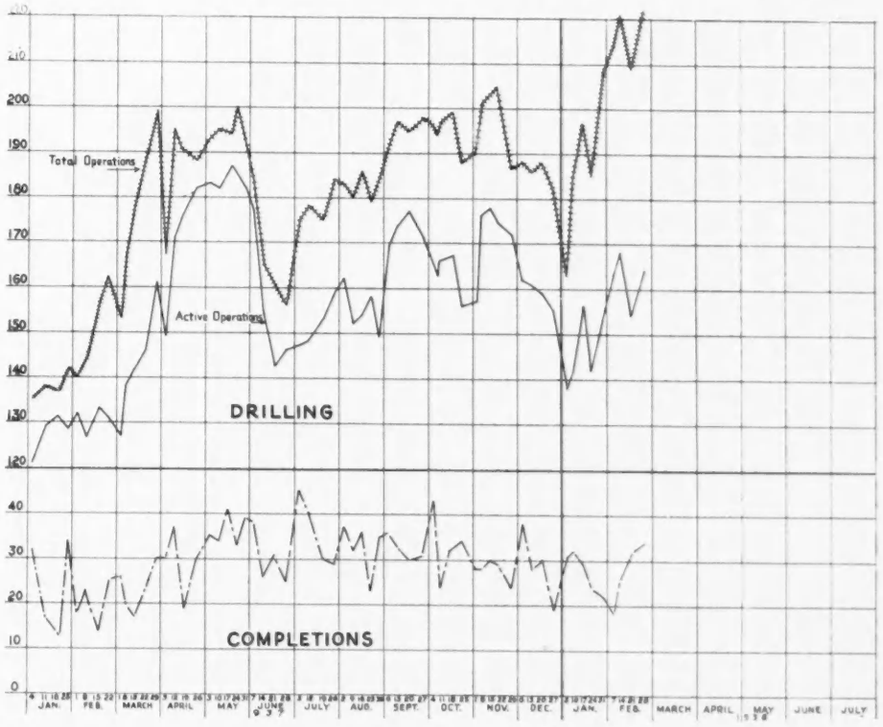
North and east of the discovery well at Cedar Bayou field, Chambers County, Ingot Oil Company and Merit Oil Company's O. K. Winfree 1, C. Smith Survey, was coring in shale around 6400 feet at the end of the week. The well is reported to be running higher than the discovery well. It will be cored to the Marginulina-Frio pay sand.

Salt Dome Oil Corporation and Standard Oil Company of Texas are driving piling out in Galveston Bay, Cedar Point field, for State 2. The well is in the tract 119 and is west of the discovery well. Humble Oil & Refining Company will move in drilling equipment soon; permit has been issued by the War Department.

Sun Oil Company is preparing to make a test on Seabreeze Land Company 1, H. T. & B. Survey, No. 102. The hole was drilled to 8889 feet in salt water sand. Seven-inch casing was set at 8865 feet and cement plug was drilled to 8783 feet. The crew will perforate casing first and then do a squeeze job. Gas sand was logged from 8429 to 8438 feet, 8507 to 8512 feet, and 8716 to 8739 feet.

A failure was marked up for Stanolind Oil & Gas Company at Turtle Bay, Chambers County. La Four 1, S. Burney Survey logged salt water sands at 6676 to 6686 feet.

An interesting wildcat location was announced in Jasper County last week: J. G. Mayo et al's L. Cartwright 1, 466 feet each way out of the southwest corner of block 29 of Cartwright subdivision, or 4500 feet west thence 5800 feet



Progress of development in the Texas Gulf Coast.

north from the southeast corner of Legrande Survey. The wildcat is located on the Legrande-Magnolia Springs prospect. Alpha Petroleum Corporation drilled a deep hole in this area and was reported to have logged sands with an odor of oil before salt water sands were encountered. Magnolia Petroleum Company once did geophysical work in this district and took a large block of acreage.

Shale Whips Another

Heaving shale finally got the best of Pure Oil Company at Peach Point; Smith 1, S. F. Austin Survey, Brazoria County, was abandoned last week at 9830 feet. The operators tried to plug back to 9100 feet and sidetrack.

Stanolind Oil & Gas Company completed another well at Sandy Point field, Brazoria County. Fite 3, D. Talley Survey, made 108 barrels daily through a ¼-inch choke, with a tubing and casing pressure of 1925 pounds. Casing was perforated from 6495 to 6499 feet.

North of Citrus Grove, Matagorda County, Sun Oil Company's Robbins 1, C. H. Vandeveer Survey was abandoned at 10,160 feet. No heaving shale was reported in this wildcat. It is understood the well was drilled "tight" and no sand records were given out.

At South Bay City field, Matagorda County, Hammon Exploration Company's Crooker 3, workover, was down to 10,300 feet last week. The well is the deepest in the field and has logged around 140 feet of sand below the regular producing horizon. It will be drilled deeper.

A gas sand was logged in Pan American Production Company's Richer 1, South Bay City, I. & G. N. No. 3. The sand was encountered from 9265 to 9266 feet.

United North & South Development Company's Lambert 1, Wilson Creek area, C. B. & M. Cotton Survey, Matagorda County, was making a test last week. While drilling cement plugs around 7900 feet the well started coming in showing gas. Pressures built up to where the operators were forced to shut the well in.

Drilling permits in Texas show substantial gain

Austin.—The Texas Railroad Commission last week granted permits for drilling 363 new wells in Texas, 166 more than were approved the previous week.

There were 74 permits granted in the East Texas field, including 49 in Gregg, 20 in Rusk, three in Upshur and two in Cherokee County. Seventeen were reported from the East Central Texas District.

West Texas operators reported 51 new locations, including 17 in Ector and 13 in Pecos County. There were 19 locations listed from West Central Texas.

Operators in the Gulf Coast area were granted 64 permits, including 11 in Brazoria and 10 in Nueces County. Southwest Texas operators reported 62 locations, including 18 in Duval and 18 in Webb County.

Permits were approved for drilling 61 new wells in the North Texas area, including 36 in Wichita County, while Panhandle operators reported 15 new locations.

Jennings north flank strike to keep 25 rigs busy.

* * *

North Crowley shallow sand discovery is good well.

* * *

Gas and distillate sand found at Lake Hermitage.

Lake Charles.—Superior Oil Company has proven that the deep sand discovered on the south and west flanks of Jennings, Acadia Parish, during 1937 exists on the north flank also. March 3 J. Clement 1, Section 46-9s-2w, was washed in and at the end of the week was flowing into burning pits at the rate of 20 barrels per hour through 15/64-inch choke, with a tubing pressure of 1000 pounds and a casing pressure of 750 pounds. The extension well was drilled to 6977 feet in sand logged at 6954 feet. Seven-inch casing was set at 6950 feet.

The field witnessed a fast drilling campaign in 1937, and it is expected that the area will continue to be the most active in South Louisiana. Discovery of the new sand on the south and west sides of Jennings last year resulted in an additional 10,000,000 barrels of new oil. If the north flank well proves up to expectations, then it probably will add another 10,000,000 barrel reserve to the field. Some are of the opinion that the new sands found on the south, west and north sides of the field will encircle the whole field.

Jennings, the first field in South Louisiana, was discovered in 1901. It has produced around 55,500,000 barrels of oil, or more than any other field in the area. The conservative estimate of ultimate recovery was 60,000,000 barrels in 1936, and now it probably will be raised to 80,000,0000 barrels. A number of new rigs will be moved into the area to take care of the drilling campaign. At present there are 11 rigs active. At the peak of the activity in 1937 there were 20 or 25 rigs at work. The new discovery of the north side will bring more than 25 rigs into play.

North Crowley Shallow Sand

North Crowley, Acadia Parish, major discovery in 1937, is living up to expectations. Last week a new shallow sand was discovered when Humble Oil & Refining Company brought in Federal Land Bank 2, Section 34-8s-1e, as one of the best wells in the field. It made 32 barrels per hour through a ¼-inch choke at 7735 feet. Casing was perforated with 12 holes from 7728 to 7735 feet. The well was drilled to 7985 feet and seven-inch casing was set at 7984 feet. The regular producing horizon at North Crowley is around 8100 feet.

New Gas and Distillate Sand

Gulf Oil Corporation discovered a new gas and distillate sand at Lake Hermitage, Plaquemines Parish, and last week was constructing a separator to make a test of the contents of the gas. Lafourche Levee Basin District 7, Section 12-18s-25e, was completed at 8720 to 8740 feet after casing was perforated with 40 holes. Tubing was run and the well came in flowing a large volume of gas and a small amount of distillate. Tubing pressure was 1750 pounds and casing pressure was 1900 pounds.

Little Cheniere prospect, Cameron Parish, jumped into the spotlight last week when reports were circulated that

TEXAS GULF COAST
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
AMELIA—		
Humble, Tyrell Combest 20	648	6773
BARBERS HILL—		
Mills Bennett, Fee 2 (wo)	151	5632
CONROE—		
W. B. Gay (Receiver), McComb 1	600	5105
DICKINSON—		
J. K. Hughes, Echret 2	¶3	9242
FRIENDSWOOD—		
H. C. Cockburn, Fee 1	*	6315
Humble, Keisling & Dixon 3	600	6048
Roberts 1	624	6041
Settegast 2	600	6040
HARDIN—		
McAlester Fuel Co., Hinson 2	461	7630
HASTINGS—		
Stanolind, Wooster 7	540	6090
LOCHRIDGE—		
Gulf, Gibson 3	300	6366
ORANGE—		
Gulf, C. Granger 1	665	5927
F. Granger 1	651	5959
Ryan & Thompson, Norwood 1	*	6500
SANDY POINT—		
Stanolind, Fite 3	108	6502
THOMPSON—		
Naylor-De Costa, Gehr 12	125	5407
TOMBALL—		
Humble, Holderrieth 1-B	*	5572
Krug 1	¶1½	5688
Martins 4	225	5580
TURTLE BAY—		
Stanolind, La Four 1	*	6686
WEST BEAUMONT—		
Stanolind & Loffland Brothers, Kyle 1	*	6530
WEST COLUMBIA—		
Sterling, Powers 1	720	5912
WITHERS—		
Texas Co., Pierce Estate C-44	285	5553
BRAZORIA COUNTY—		
Pure, Smith 1, Peach Point area, S. F. Austin sur	*	9830
MATAGORDA COUNTY—		
Sun, Robbins 1, n of Citrus Grove, C. H. Vandeveer sur	*	10160

*Failures; †Junked; ¶Million cu. ft. gas.

Humble Oil & Refining Company's Miami Corporation 1-B, Section 7-14s-6w logged oil sands around 5600 feet and that royalty prices had skyrocketed. However, the rumor could not be confirmed in Houston. Reports state that the well was drilling below 7422 feet in shale. This wildcat probably will be a deep test.

The first wildcat in South Louisiana to try for Sparta production along the Conroe trend since the discovery of Villa Platte, Evangeline Parish, is Republic Production Company's Lutcher Moore 1, 330 feet north and 330 feet west of the SEc NE¼ SW¼ Section 10-6s-13w, Beauregard Parish, on the De Quincey prospect. Gulf Refining Company and Federal Production Company have drilled deep Cockfield dry holes in this area.

In Avoyelles Parish, G. C. Koch announced location for L. O. Kelone 1 on the Marksville prospect. It is 190 feet from the south line and 385 feet from the east line from L. G. Kelone tract in Section 21-2n-3e. The well is near Coastal Minerals Development Company's dry hole.

On the South Crowley prospect, Acadia Parish, Humble Oil & Refining Company's Boyd Finch et al 1, Section 22-10s-1e, was coring shale at 8419 feet at the end of the week. Sands with an odor of oil were logged from 8260 to 8275 feet. Two drill-stem tests of these sands failed.

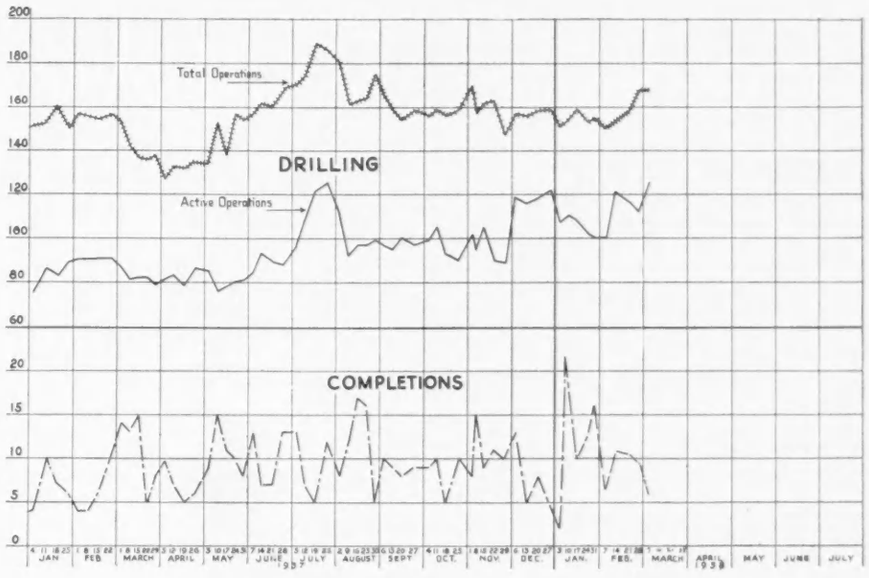
Two Important Wildcats

Two important wildcats in St. Martin Parish were drilling ahead last week.

SOUTH LOUISIANA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BAYOU BLUE—		
Humble, Schwing Lbr. Co. 1.....	*	7015
BOSCO—		
Superior, Forrester 1 (wo)	96	8125
CHARENTON—		
Pan American, Robichaux 2.....	260	1860
JENNINGS—		
Superior, Iowa-Jennings 3	400	6847
LAKE PELTO—		
Texas Co., State 20	946	6220
NORTH CROWLEY—		
Humble, Federal Land Bank 2.....	768	7735
BOSCO—		
Gulf, Anding 1 (wo)	*	8701

*Failures; †Junked; ¶Million cu. ft. gas.



Progress of Development in South Louisiana

In the Section 28 area, Carter, Stewart et al's Martin 2, Section 32-9s-7e, was coring soft sand at 4409 feet at the end of the week after making a drill-stem test from 4367 to 4399 feet which showed a trace of oil and 18 thribbles of salt water in 28 minutes. In Lake Mongouloi salt dome area, The Texas Company's State 4, Section 14-10s-9e, was coring shale at 8171 feet last week. It was reported that the well logged a sand at 7723 feet showing oil. This could not be confirmed. The wildcat did encounter a sand at 7631 feet that showed 180 feet of 34 gravity oil and 1600 feet of salt water on a drill-stem test.

On the Minor prospect, Terrebonne Parish, Shell Petroleum Corporation made location for Realty Operators C-1, 2200 feet south and 440 feet west of the northeast corner of Section 10-18s-16e. Several shallow wells have been drilled in the area and some have had shows. This is the third wildcat on Realty Operators acreage for Shell Petroleum Corporation. The first was a 10,000-foot dry hole, the second was the discovery well at Gibson, and the new Minor wildcat is the third.

Another test was made on Amerada Petroleum Corporation and Louisiana Land & Exploration Company's St. Charles Land 1 at Bayou Des Allemands, St. Charles Parish. Last week the extension well was perforated with 20 holes from 5412 to 5417 feet and a 10-minute drill-stem test showed 14 stands of mud and salt water.

Shreveport.—Seventeen drilling permits were authorized last week by the Louisiana Conservation Commission of which nine were for North Louisiana divided among the following parishes: Caddo, 2, neither in Rodessa; Claiborne, 2, both in Lisbon; and Webster, 5, all in Cotton Valley. The 8 in south Louisiana were divided among the following parishes: Acadia, 3, Beauregard, 1; Evangeline, 1; Terrebonne, 2; and Vermilion, 1.

Ponca City.—Osage Pipe Line Company has been awarded contract for the laying of 14 miles of oil pipe line connecting the Ainsworth and Trapp pools of Barton and Russell Counties, Kansas. Work on the new line will be started as soon as weather permits.

Jennings—an old South Louisiana field that is coming back strong.

NORTH LOUISIANA

Cotton Valley drilling operations on increase.

* * *

West Zwolle well is moving in casing to test good show.

Shreveport.—W. J. Furlong, Jr., and associates (Hunter and Rowe) ran electrical device last week to 6515 feet, contract depth, in E. M. Clarke 1, NW SE NE 10-20n-7e, Morehouse Parish wildcat, at the southeast end of the 220-mile northwest-southeast Buckner-Snow Hill-Schuler trend. From determinations of this will come a decision as to whether to deepen.

The test was still in quartz sandy formation, identified by some as still lower Marine, while other determinations set top of Permian at 6218 feet; elevation is 103 feet.

In the same parish, Harry Hawthorne of Bastrop, Louisiana, agent for a major oil company, secured geophysical option on the holdings of Crossett Lumber Company in Township 23 north, Ranges 6 and 7 east, bordering the Arkansas line.

Cotton Valley Work Gains

The Cotton Valley field, Webster Parish, continues to gain activity, seven new locations having been announced there last week, despite reports that some operators have been holding back from that field for fear that the gas/oil ratio of the gas-distillate production from the lower Marine at 8100-8400 feet might soon begin to recede, leaving the production as dry gas. This field is classed as a gas field and allowables are based on gas production. It is known that other sand strata in the lower Marine below the present Bodcaw horizon are capable of producing and that the Travis Peak (Holloway) sand with 6 producers is productive of oil. However, its saturation is not uniform throughout the field and in some spots no saturation occurs.

One half mile outside former Travis Peak productive territory, 16 feet of saturation in this horizon was revealed when electric log was run in Ohio Oil Company's Gray 23, Section 27-21n-10w. Top of saturation was 5644 feet. This well, however, was drilled to the Bodcaw horizon at 8160 feet.

Atlantic Refining Company added to its holdings at Lisbon by purchasing 80 acres in the northeast end of the field, SE NW 28-21n-4w, and SE NE 29-21n-4w.

T. L. James & Company are blocking acreage for a proposed 6000-foot test southeast of Arkansas-Louisiana Gas Company and others' Glen Rose gas-distillate well in Section 32-19n-2w, Lincoln Parish, near Ruston.

Although extending the producing limits of the northeast end of the Louisiana side of Rodessa three fourths of a mile north Freeman W. Burford's H. Clay Brown 1, C N½ NE SE 5-23n-15w, completed as an oil well last week, proved disappointing as to volume.

Three thousand gallons of acid were used after casing was perforated with 57 shots from 6044 to 6071 feet and with 66 shots from 6084 to 6100 feet, and the well was completed making 16 barrels of oil per hour through 1-inch tubing choke with 500 pounds of input pressure. Total depth is 6124 feet and production is coming from the Gloyd horizon.

A west edge well was completed in the Jefferson end of Rodessa in Marion County, Texas, when Phillips Petroleum Company's Lockett 1, U. Ewing Survey, at 6170 feet, flowed 21 barrels of oil per hour through ¼-inch choke with casing pressure 500 pounds and tubing pressure 100 pounds. Gas/oil ratio was estimated at 350 to 1.

Arkansas Fuel Oil Company was preparing to plug back to 6110 feet from 6121 feet in Holland 1, J. Hanks Survey, Marion County, after salt water appeared during testing. It is on the southwest edge of production on the Lodi nose. This company made location for I. E. Hill 1, (13.5 ac.), T. Gillispie Survey, south of its Neilon 1, outpost producer.

Moving in Casing for West Zwolle Well

Sutton-Zwolle Oil Company, H. D. Easton and others were hauling in 7-inch casing to set last week in Sabine Lumber Company 1, SE NW NE 23-7n-14w, after this test showed 1200 feet of clean light sweet oil in a drill-stem test from 12 feet of saturated sandy lime from 3841 to 3853 feet. The testing tool was open 9 minutes, with ¼-inch choke on top and ⅜-inch choke on bottom, with pressure of 275 pounds. Elevation is approximately 165 feet.

Gravity of the oil was 33.9 as shown in an analysis of a drill-stem sample. It is dark in color.

The formation was identified as Washita, a horizon productive at 3200-3400 feet in the old Pleasant Hill field, Sabine Parish, located in township 10 north, range 12 west.

Operators were forced to pump in considerable mud to hold in the well, pending arrival of casing.

Should this test prove a commercial well it will mean the opening of a new producing horizon in the West Zwolle (Blue Lake) field where 5 shallow wells at the 2100-2200-foot level were completed late in 1928 and early 1929. They have been abandoned for several years. The discovery well of this area was completed on Thanksgiving Day, 1928, at R. L. Gay and Walter E. Cooke's Bowman-Hicks 1, NW SE 14-7n-14w, at 2130 feet, making 50 barrels of oil daily. Easton was also associated with Cooke and Gay as a geologist on this well.

Present test which was designed for a 10,000-foot operation, unless production is found above, is on a block of several thousand acres made up of holdings of four lumber companies.

Part of this crew drilled the first producing well in the Jefferson area, Marion County, extension of the Rodessa field, The Hunter Company's Fonda 1. Left to right they are C. R. (Curley) Dees, driller; G. W. Range, derrickman; H. O. Scott, fireman (the three who drilled on the Fonda well) Happy Blevins and Vincent Rice, helpers. The picture was made on the rig of Rice Drilling Company, Inc., which was drilling Flesh & Hootkins' Whitfield 1, Marion County, Texas.

ARKANSAS FIELDS

Schuler well flows oil from Permian; 30 barrels per hour.

* * *

Interest in Schuler-Buckner 220-mile trend continues.

El Dorado, Ark. — Kerr-Lynn Oil Company's Barnett 1, Section 14-17-20, Columbia County, midway between the Schuler and Buckner fields started to flow oil Friday afternoon following perforation of casing from 7623 to 7651 feet in Permian lime. Flow started after swab was run twice. The well was allowed to flow 30 minutes and then shut in awaiting arrival of tubing and tanks. Corrected total depth is 7740 feet.

El Dorado, Ark.—Arkansas' second real oil well from Permian lime was completed last week in the Schuler field, Union County, which previously had accounted for a Permian gas distillate well. The lone producer in the Buckner field, Columbia County, hitherto had been the state's only real oil well from the Permian lime.

The new Schuler Permian well is Marine Oil Company's M. Justiss 4, C Lot 7, NW 18-18-17, drilled to 7719 feet where casing was set and perforated at 7650-58 feet with 20 shots. It was completed flowing 30 barrels of 36 to 42 gravity crude per hour through ¼-inch choke, and making estimated 750,000 to 800,000 cubic feet of gas daily.

It is ¼-mile north of Lion Oil Refining Company's Edna Morgan 1, same section, completed as the discovery well of the Travis Peak at Schuler, and later deepened to Permian (Reynolds) lime where it was completed as a gas-distillate well. No proration so far exists on this horizon at Schuler.

Only other Permian lime production found so far in Arkansas was the gas-distillate production at Snowhill, Ouachita County, Section 27-15s-15w, where 5 wells were completed, this being the first Permian lime production in Arkansas or North Louisiana.

Location for another Permian lime wildcat test "in the trend" and on a geophysical location, was made last week by Phillips Petroleum Company. The new test is Marsden 1, NE SW 9-16s-11w, Bradley County. It is on a 5000-acre block which adjoins another 15,000-acre block owned by the same company centering around Section 22-19s-12w, Bradley County.

Meanwhile leasing activity continued at several points along a 220-mile northwest-southeast Schuler-Buckner "trend." In Ashley County, Amerada Petroleum Corporation has a seismograph unit working near the town of Hamburg. Two miles east of the Kerr-Lynn test and three miles west of Standard Oil Company of Louisiana's Phillips 1, Section 15-17s-19w, Columbia County, Tide Water Associated Oil Company leased W½ NE 18-17-19.

Biggest lease play of the week was southwest of the old shallow Stephens field where Hunt Oil Company, Standard Oil Company of Louisiana, Shell Petroleum Corporation, and others leased extensively in township 15, range 20, with indications the play was extending into township 15, ranges 21 and 22.

Leases Taken

Farther to the northwest "in the trend," Sun Oil Company has leased over 3000 acres in townships 14 and 15, ranges 24 and 25. McAlester Fuel Company leased NE SE 10-16-22, at Buckner and southwest of Taylor in township 19, range 23, Sun Oil Company leased 280 acres. In the leasing play around Wesson, Union County, Standard Oil Company of Louisiana secured 4000 acres in townships 18 and 19, range 16 and in the same area Lion Oil Refining Company secured about 3400 acres with Tide Water Associated Oil Company securing about 2500 acres. Sun Oil Company continues to lease acreage in township 19, ranges 11, 12,

NORTH LOUISIANA

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CADDO PARISH (Pine Island)—		
Double H Oil Co., Goodwin 1, 33-21n-15w	5	1630
Patterson & O'Mara, Player 1, 26-21n-15w	8	2233
Magnolia, Dillon 23, 23-21n-15w	30	1690
CADDO PARISH (Dixie)—		
Anderson & Gilbert, Pittman 1, 14-19n-14w	*	2530
BOSSIER PARISH (Sligo)—		
Triangle Drlg. Co., Herold A-2, 13-17n-12w	100	3125
DE SOTO PARISH (Bull Bayou)—		
A. P. Barrett, Jal Drlg. Co. 1, 7-11n-11w	50	2809
CLAIBORNE PARISH (Lisbon)—		
Tippett Drlg. Co., Aycock 1, 1-20n-5w	1368	5370
CADDO PARISH (Rodessa)—		
F. W. Burford, Brown 1, 5-23n-15w	384	6170
SABINE PARISH (Zwolle)—		
Hunter Co., Bowman-Hicks 2, 12-7n-13w	110	2563
WEBSTER PARISH (Cotton Valley)—		
North American Cons. Oil Co., Coyle 1, 28-21n-10w	600	8296

*Failures; †Junked; ¶Million cu. ft. gas.

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SHREVEPORT LOUISIANA

Lake Charles—Houma—Converse
New Iberia—Rodessa—Monroe
Cotton Valley—Greggton
Houston

13, 14, and 15. A new lease play also has developed around Section 15-17-18.

At Schuler, Texas, Canadian Oil Company leased 180 acres in Sections 35 and 36-18-17, and in the same area Atlantic Refining Company secured N½ SW SW 23-18-17.

The second test to the Permian lime of the Buckner field, Columbia County, Arkansas, located three-fourths of a mile southwest of the discovery well, was abandoned last week as a salt water hole.

The abandoned test, first to reach the Permian lime since the discovery well, was Lyons & Neely's Lillian Taubel 1 (Tatum fee), SE NW 18-16-22, La-Fayette County, abandoned at 7282 feet, after logging 10 feet of lime carrying salt water. The discovery well of the field is Standard Oil Company of Louisiana's J. P. McKean 1, SW SW 8-16-22,, completed at 7258 feet after logging 47 feet of saturated formation. Standard is drilling two other tests in the area, one in NW SE 8-16-22, and the other in SE NE 18-16-22, drilling below 6000 and 6800 feet, respectively.

Buckner provided the first oil production from the Permian lime in Arkansas.

Lyons & Neely's test logged top of lower Travis Peak at 5307 feet, after logging top of massive anhydrite at 3298 feet; elevation was 252 feet.

Three Arkansas permits

El Dorado, Ark.—Three drilling permits were authorized last week by the Arkansas Board of Conservation, as follows. Bradley County—Phillips Petroleum Company, Marsden 1, located 330 feet from north line and 662 from east line SW 9-16-11; Calhoun County—J. R. Lockhart's Henry Hearnsberger 1, 290 west and 310 north SEc SE NE 16-11-13; Union County—Phillips Petroleum Company, M. Justiss 4, 330 from north and west lines, Lot 6, in NW 18-18-17.

Geophysical work in northeast Arkansas and west Tennessee

An event of considerable importance is the recent start of geophysical work in Craighead County, northeastern Arkansas, and in Landerdale County, western Tennessee. Up to now, no exploration work has been undertaken in these areas, with the exception of a magnetometer survey, which was completed several months ago. Considerable acreage is under lease in these districts, and the recently started torsion balance work is being undertaken on contract.

ARKANSAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
LAFAYETTE COUNTY (Buckner)—		
Lyons & Neely, Taubel 1 18-16-22..	*	7282
UNION COUNTY (Schuler)—		
E. M. Jones, Murphy Land Co. A-1, 19-18-17	700	7557
Marine Oil Co., Justiss 4, 18-18-17..	720	7719

*Failures; †Junked; ¶Million cu. ft. gas.

ROCKY MOUNTAIN FIELDS

Eastern Colorado wildcat is acidizing.

* * *

Two Wyoming wildcats are showing.

Casper, Wyo.—Three Rocky Mountain wildcats, one in Eastern Colorado, and two in Wyoming were at critical depths as the week closes. Gulf Oil Corporation's Union Pacific-Larsen 1, CSE NW 13-13s-94w, on a 26,000-acre drilling block, 6 miles northwest of Kit Carson, Cheyenne County, eastern Colorado, and 40 miles west of the Kansas line, is acidizing at 4808-13 feet in the Shawnee lime, preparatory to retesting. Though the well showed heavy saturation in cores recovered from the top of lime, it failed to respond on production test through 2½-inch tubing with 10¾-inch casing set at 4805 feet. Operators plan to drill the formation by five foot stages and acidize.

Thirteen miles northeast of Casper, on the Cole Creek structure, Natrona County, General Petroleum Corporation is running 9⅝-inch casing to the top of the Wall Creek horizon preparatory to a production. Hole bottoms below 6800 feet, operators having refused to disclose formation points. Hole has been electrically surveyed and good porosity is reported with oil and gas shows. The test is Government 1, CNW SE 21-35n-77w. General Petroleum Corporation, western producing subsidiary of Socony-Vacuum Oil Company, holds a 17-000-acre solid block surrounding the Cole Creek test. The entire acreage, the substantial portion of which is Government leases, has been unitized. Cole Creek is located 30 miles south of Salt Creek, and 9 miles north of Big Muddy, fields which are prolific oil producers from the Wall Creek sands.

Stanolind Oil & Gas Company's Johnson 1, CSE¼ SE 3-33n-96w, Beaver Creek structure, Fremont County, is coring and feeling ahead for the Muddy sand at 7994 feet. The well had an estimated 1,500,000 cubic feet of gas daily in the Wall Creek horizons of the Frontier at around 6500 feet.

Lance Creek outpost, C. L. Price's Lamb 1, NE NW NW 7-35n-65w, a quarter mile west of the nearest Leo sand production, is coring at 5293 feet and feeling for the second member of the Minnelusa series.

Ohio Oil Company's Converse Sheep Company 8, CNW SE SW 32-36n-65w, made the first gas completion in the Leo sand, Lance Creek field, when this week it completed for 1,500,000 cubic feet daily at 4924-94 feet. A top structure well, Converse 8, ran expectedly high. The well will probably be designated for a gas input well in the contemplated unit development of the Lance Creek field. The well makes the eleventh completion since Minnelusa discovery the past June. Nine of the wells yielded oil, and only one was a dry hole.

Continental Oil Company's Dielman 3-A, SE SE SW 5-35n-65w, a Lance Creek outpost on the southwest, is drilling near the Sundance at 3924 feet. Continental's Apex 1-Account 3, SE SE NE 34-36n-65w, offset to the Minnelusa discovery, is drilling at 5281 feet and nearing completion depth.

Another Lance Creek well at critical depth is Argo Oil Corporation's Ford 6, SW NW 33-36n-65w, an outside location on the northeast side of the field, is drilling in the Minnelusa formation at 5172 feet.

Another at Salt Creek

Stanolind Oil & Gas Company brought in a fourth deep well in the Salt Creek field this week by the selective method in its campaign to develop Tensleep production. Company's Tensleep 29, CSW SW 26-21n-79w, flowed 240 barrels of oil initial through a 3/16-inch bean on the 2½-inch tubing. Casing is set on the bottom of the formation at 4099 feet, and perforated opposite oil strata. Because of the difficulty of separating thin lenses of water sand interspersed through the oil horizons in the Tensleep formation, operators have found Tensleep completions difficult in producing clean pipe line oil. Stanolind's careful electrical logging procedure and gun perforating through bottom hole casing apparently has solved this problem, and these completions have been watched with keen interest by other Wyoming operators. Stanolind is perforating and testing by stages in its Tensleep 8, CNW NW 35-40n-79w, with casing set in saturation at 3997 feet, and has two more deep wells scheduled for immediate drilling.

Two wells in the Elk Basin field, Park County, northern Wyoming, are preparing to complete. Ohio Oil Com-

MOUNTAIN STATES

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
COLORADO		
RIO BLANCO COUNTY (Wilson Creek Field)—		
Texas Co. & California Co., Freeman 1, cse nw 35-3n-94w	492	6918

*Failures; †Junked; ¶Million cu. ft. gas.

pany's Mack 4-OPC 4, SE SW SE 30-58n-90w, is testing gas and show through the tubing with hole plugged to 2850 feet in the Frontier. The well backed up from negative tests in the Dakota series with total depth at 3092 feet.

Sha-Wa Petroleum Corporation's Government 2, SW SW NW 35-9s-23e, an extensioner to the northwest on the Carbon County, Montana, side of the Elk Basin field, is drilling out cement at 3037 feet, which was run to shut off water that broke through casing seat. Well ran cement to 3037 feet above the Dakota sand at 3042-84 feet where it had good showings of oil and gas.

Mountain Fuel Supply Company finished up its drilling campaign this week to validate several government permits and ripen them to leases in the Baxter Basin area, Sweetwater County, southwestern Wyoming, with the completion of a small gas well. Company completed its Agnes Fay 1, CE NE SE 18-18n-103w, for 60,000 cubic feet daily from the Frontier at plugged depth of 1839 feet. Well was drilled to the Dakota where it failed to obtain production.

In the Big Medicine Bow field, Carbon County, Wyoming, Ohio Oil Company and The California Oil Company's Union Pacific Johnson, SW SE 23-21n-79w, is testing the Upper Sundance formation at 5330-50 feet. Well backed up from the Second Sundance where it had water. Joint operators' William A. Kyle, NE NE 26-21n-79w, on the discovery lease, is testing through the drill stem at 5411-5445 feet in the Second Sundance sand.

A modulation in the severe winter weather and more optimistic marketing outlook under the impetus of northern refinery building and statewide campaign to use Montana made gasoline boosted activity in the Kevin-Sunburst and Cut Bank fields.

Kevin-Sunburst had three first reports: Big West Oil Company's Gunderson 5, NW NE NW 19-35n-2w, spudding; Charles Grant's Anderson 1, SE NE NE 26-35n-2w, drilling at 306 feet; and R. G. Parrant's Fee 1, CSW SE 26-35n-4w, drilling at 409 feet.

Three wells likewise got underway in the Cut Bank field. Texas Company is rigging rotary for Lindquist 1, CSE SE 17-32n-5w; Glacier Production Company's McNamer 1, CEL SE NE 15-36n-5w, is drilling at 695 feet, and Santa Rita Oil & Gas Company's Tribal 8, CNE SW 16-35n-2w, is cementing the 10¾-inch casing at 607 feet.

Assemble big block for Alabama test

Mobile, Ala.—Arkansas Fuel Oil Company and J. B. Greer of Shreveport, Louisiana, have assembled a block of several thousand acres on the upper end of the Jackson Fault in Clarke County, southwest Alabama, for a test to be drilled in the vicinity of Section 32-8n-1e, to be started by May 18. The block lies in townships 7 and 8 north, range 1 east, and is roughly bounded on the south by Jackson Creek, on the east by Tattilaba Creek, on the north by Kantosh Creek, and on the west by a range of hills east of the Tombigbee River.

Interest in Arizona is increasing

Phoenix.—Arizona's oil seepages and geological structures are being thoroughly investigated, and several of the major companies are becoming interested. Numerous drilling blocks are being taken at the present time, several by major companies. Such companies as Continental, Sinclair, Shell, and Standard of California are making bids for blocks on the state land, as well as on the land in the Indian Reservation controlled by the federal government.

In the past, Arizona has confined its activities principally to mining, viz., copper, silver and gold. The Geological Department of the University of Arizona has given practically no attention to petroleum or its production. Of the 70 or 75 wells drilled within the state, only about one-third have been to a depth that would adequately test the possible producing formations in that particular area. One well has been drilled to a depth in excess of 4500 feet, and one well near San Simon, in the northeast part of Cochise County, is now drilling at 6275 feet with reported shows of oil and gas. It is reported that immediately north of this well, near Safford, a well is to be drilled on the block consisting of approximately 30,000 acres. A rig has been completed and operations should start soon in Southwest Cochise County, near the town of Sonoita. This well is a few miles north of the well drilled near Elgin in Santa Cruz County several years ago. The reported depth of the well near Elgin is 1200 feet. The contract for the new well calls for a 6000-foot depth. The Sonoita (Empire Ranch Well) is located on a structure that has been worked on cretaceous formations and is very favorably located. Another well is being started in the town of Willcox, which is in northeast Cochise County. It is interesting to note that in the town of Willcox, near the town of Casa Grande and in the vicinity of Phoenix there is a high-grade oil produced from the surface water ranging in depth from 14 to 178 feet. While the source of this oil is not definitely known, indications from analysis indicate that it is a petroleficious oil, the same as the shallow oil reported in the Culver City, California, airport. The gravity of this oil is 54 A.P.I. and the end point is 360. The well at Willcox, with a depth of 14 feet is known to have produced in excess of 800 barrels of this high-grade oil within two years, and at present a barrel or more of oil can be gotten from this well within a very short period of time. The well at Casa Grande has been abandoned as an irrigation well for the reason of the oil. The well at Phoenix is now capable of producing somewhere between 6 and 8 barrels of this light oil per day.

A great many of the valleys in the southern part of Arizona must be worked by some type of geophysical instrument due to the fact that the surface of the deep valleys between the ranges are filled only with more recent formations consisting of sand, gravel and soft clay.

Inasmuch as Arizona owns a very large part of the land within the state (this land and all of its leasings being controlled by the State Land Department), the state has retained a geologist to investigate the possible oil producing areas and hopes to have some very definite action during the ensuing year. (There are some laws pertaining to the leasing of the state land that are somewhat confusing and very irregular, comparatively speaking, with the lease laws of other states.) There is a movement on foot to have these laws changed so that they will be reasonably consistent with the laws of other oil producing states.

Nebraska school lands leased for oil development

Lincoln, Nebr.—Land Commissioner Leo N. Swanson announced granting of six mineral leases on state school land last week for oil prospecting. They provide $64 a section annual rental fees payable to the state and call for 12½ percent royalty on any production obtained.

Leases on the lands, which are in Lincoln and Sioux Counties, were granted to Helmerich & Payne, Inc., Tulsa; L. B. Walters and D. M. Dolley, Los Angeles, and R. T. Sellers, W. D. Bostwick, A. F. Erhart and J. J. Ruck, Denver.

Washington wildcat

Wenatchee, Wash. — Norco First Drilling Corporation's wildcat near here is drilling below 3193 feet, having lowered six-inch inside diameter casing to 3158 feet. Reports from the well indicate considerable gas and small showings of oil, increasing in liveness with the increase in depth. The bottom two feet of hole is hard, coarse grained sandrock carrying a filler of calcium carbonate.

North Dakota school lands to be explored

Bismark, N. D.—Commissioner Ole B. Stray announced that the North Dakota land board has approved the request of the Standard Oil Company of California to make a preliminary oil prospecting survey of about 4500 acres of school lands in the Nesson flats area. Leases will be drawn up if the survey results in "encouraging signs," Stray said.

The company is drilling a deep wildcat test in the area, which is temporarily shut down at 6750 feet because of a shortage of water for drilling operations. Drilling is scheduled to resume this month.

South Mississippi geophysical investigation

Jackson, Miss.—Southern Mississippi continues to get the bulk of geophysical exploration in the state. The California Company has a gravimeter unit working in township 3 north, range 9 east, Pike County, and a reflection unit in Amite and Pike Counties, around township 4 north, ranges 6 and 7 east. Sun Oil Company has a gravimeter unit working in Pike County, near McComb. The same company has a torsion balance unit working near Picayune, Pearl River County. Shell Petroleum Corporation has two gravimeter units working in Adams and Wilkinson Counties. Union Producing Company (United) with a reflection unit is running lines in George and Perry Counties.

Vacuum pool will be busiest in Lea County soon.

* * *

East outpost offset flows 85 barrels per hour.

* * *

Prospect of extending Langlie sandy lime area.

Hobbs, New Mexico.—Development of Vacuum field is expanding at sufficient rate to indicate that it will be the outstanding drilling center in Lea County in the near future. The area set the pace the past week for older fields in the county with four of the nine new locations, and also contributed three prolific high gravity oil wells from the 4600-foot lime. Performance of these new completions will stimulate new drilling. Every completion requires from one to four direct offsets due to the adoption of the 40-acre unit spacing, with the well in the center.

Magnolia Gets Two

Magnolia Petroleum Company, owner of the discovery block, increased its total completions to six by adding two natural flowing wells the past week. This company's State 1-I, C NW SE 36-17s-34e, is rated as one of the largest wells in the field, having gauged 875 barrels of 38 gravity oil in 11 hours through one-inch choke, with 160 pounds back pressure on the tubing. Production is from saturated Permian at 4395-4626 feet, and main pay was topped at 4418 feet, with an elevation of 4001 feet. Average flow of 20 barrels per hour for 30 hours through 35/64-inch choke was maintained by the company's State 1-H, C NW NW 31-17s-35e, from broken lime at 4403-4662 feet, with an elevation of 3997 feet. Drilling is in progress on the company's State 1-J and State 1-K. Derricks have been erected for State-Bridges 4, C NW NE 26-17s-34e, and State-Bridges 5, a west offset.

Confronted with a major drilling program, Magnolia Petroleum Company is preparing to erect a field camp and warehouse facilities. A separate district has been created for this and other Lea County operations. R. H. Alexander has been promoted from foreman to district superintendent.

Line Outlet Proceeding

The Texas New Mexico Pipe Line Company is proceeding with the previously announced pipe line outlet for Vacuum field, using 8-inch gravity line in tying into its Lynch pool station.

Ohio Oil Company's State-Warn 1, C SE NW 31-17s-35e, south offset to the most easterly producer in the Vacuum area, was drilled to 4664 feet, or 673 feet sub-sea, and flowed 85 barrels per hour natural. The company has moved rig to drill State 1, C SE SW 30-17s-35e. Geo. F. Getty, Inc.'s State 1-F, C SE NE 36-17s-34e, flowed 5½ barrels hourly through ¼-inch choke after using 7000 gallons of acid solution at 4550 feet, or 548 feet sub-sea. It may be deepened to the more prolific zone found by Ohio Oil Company's completion in the east sector without obtaining water. Amerada Petroleum Corporation and Phillips Petroleum Company each have two rigs running. Continental Oil Company has made its initial entry in starting work on State 1-H-35, C SE NE 35-17s-34e, offsetting production. The Texas Company is confronted with five producing offsets that will be taken care of shortly.

No Fluid Level Gain

No appreciable gain in fluid level was recorded by The Texas Company's M. A. Corbin 1, C NW SW 10-18s-33e, western Lea County wildcat reported last week as giving promise of a new discovery. First oil was logged at 4267 feet, and the column of oil was kept lowered to 650 feet by bailing at intervals while drilling at 4403 feet. It has an elevation of 3984 feet, and is considered structurally low for the area. However, it is likely to make a producer after nitro shot and acid.

Continental Oil Company et al's Marsh 1-A-31, C NE SE 31-20s-39e, eastern Lea County wildcat, was cleaning out bridge formed at 4004 feet after 440-quart nitro shot at 4136-4346 feet. No oil or gas was evident. The well bailed three to four gallons of oil per hour before shot.

Extension of the Langlie sandy-lime area about 2¾ miles to the southeast appeared encouraging last week when Geo. F. Getty, Inc.'s Riggs 1, NW NW NW 1-26s-37e, developed 400 feet of oil in hole from pay at 3235-38 feet, with an elevation of 3027 feet. It is structurally high for the area, but missed the big gas zone in the upper lime.

Shell Petroleum Corporation's State 1-A, C NW SE 16-23s-36e, northeast outpost for the older section of the Lynn area, failed to encounter the prolific oil and gas zone in drilling to 3700 feet, or 254 feet sub-sea. On preliminary test this well flowed 160 barrels fluid, 56 percent water, through open tubing. Observers credited the water with being rotary returns, but an analysis is to be made. Gulf Oil Corporation has started operations on J. Whitten 1, SE SE SW 33-23s-36e, offsetting the northwest outpost for the Cooper field.

The Texas Company's State-University 14, SW SW NW 19-20s-37e, near the intersection of Eunice and Monument areas, flowed 167.27 barrels oil in eight hours through open tubing after using 2000 gallons of acid at 3810-65 feet. Continental Oil Company et al's Reed 3-B-23, C E½ SE SE 23-20s-36e, is a new project for the west edge of this sector.

Rhodes Gasser

An initial gauge of 19,500,000 cubic feet of wet gas, testing 2/10 percent sulphur per 100 feet, was credited to The Texas Company et al's H. G. Moberly 1-B, C NE NE 21-26s-37e, offsetting production in the Rhodes pool. Production is from broken sandy-lime at 3005-3180 feet, with an elevation of 2995 feet. All previous completions in this area have converted from gassers to flowing oil wells after selling gas for a period of weeks.

In eastern Eddy County, R. A. Shugart et al's Coulthard 1, C NW SW 35-18s-31e, which has been in process of completion and deepening since last October, has plugged off sulphur water at 4068-88 feet. This wildcat encountered first oil at 3440-47 feet, with an elevation of 3632 feet, and picked up additional oil pays in deepening by stages. Hole was full of oil when water appeared.

NEW MEXICO Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CHAVEZ COUNTY—		
English & Harmon, Billingslea 1, nw se 9-15s-29e	*	3680
EDDY COUNTY—		
Nash et al, Jackson 8-A, c se se 13-17s-30e	550	3518
LEA COUNTY (Eunice)—		
Elliott et al, Elliott 1, ne ne se 26-20s-36e	750	3780
Gulf, State-Bell 6-F, c nw sw 36-20s-36e	1567	3855
Texas Co., State-University 14, sw sw nw 19-20s-37e	502	3865
LEA COUNTY (Hardy)—		
McDowell & Weiner, E. M. Elliott 1, se se se 19-21s-37e	158	3821
LEA COUNTY (Mattix)—		
Repollo, Carter 1, sw sw ne 9-24s-37e	28	3705
LEA COUNTY (Monument)—		
Ohio, State-Hansen 4, c w½ se ne 16-20s-36e	960	3855
LEA COUNTY (Penrose)—		
Street et al, Woods 3, c nw ne 22-22s-37e	250	3688
LEA COUNTY (Skelly)—		
Samedan Oil Corp., Hughes 5, c ne sw 10-23s-37e	85	3608
LEA COUNTY (Rhodes)—		
Texas Co. et al, Moberly 1-B, c ne ne 21-26s-37e	¶19½	3180
LEA COUNTY (Vacuum)—		
Magnolia, State 1-H, c nw nw 31-17s-35e	960	4662
State 1-I, c nw se 36-17s-34e	2500	4626

*Failures; †Junked; ¶Million cu. ft. gas.

Henderson rules amended

Austin.—The Texas Railroad Commission has amended its rules for the Henderson field in Winkler County, to permit omission of the intermediate string of casing formerly required, and to require that cement set two days instead of three.

ILLINOIS DEVELOPMENTS

Fayette County test finds saturation.

* * *

Second producer completed in Dix field.

Olney, Ill. — Illinois field developments were without sensational completions, but saturation was found in a Fayette County test which may establish this county in the ranks of the state's oil producers. Farrelly et al's H. E. L. Lilley 1, Section 16-8n-3e, Louden Township, in the extreme northeast part of the county, encountered saturation at 1498 feet and was deepening into the sand at last report. This operator's lease of 118 acres is completely surrounded by a Carter Oil Company block on which two fair producers have been completed previously. Nine other tests drilled in this county during the past year, however, were failures.

In the Dix field, the Carter company brought in its second producer, the Lide Douthit 1, Section 9-1s-2e, Rome Township, Jefferson County, with initial production of 147 barrels. Production is from the Benoist sand, found at about 2000 feet or 600 feet deeper than the formation has been encountered in the Centralia field to the north. The company's Tate 1, Section 10-1s-2e, Rome Township, opened the field early this year with an initial of 58 barrels the first 18 hours. It has recently been making 40 barrels of oil and 20 barrels of water a day on the pump. While some water was pumped by the Douthit well during the first 12 hours, the sand now appears to be clear. Derrick is going up for the company's third well in the area on the J. H. Copple farm, south of the Douthit 1.

Gulf Oil Corporation's G. W. Hill 1, Section 2-4n-10e, Preston Township, Richland County, north of Olney on the route to Dundas, failed to find the McClosky after repeated coring in the neighborhood of 3000 feet and was drilling slowly ahead last week below 3150 feet. Officials refused to discuss rumors that the well will be made a deep test to the Devonian or Trenton sands, another 1000 feet down. Meanwhile Olney's greatest interest, Morrison & German's G. Conour 1, first test to be undertaken within the city limits, reached a depth of 2940 feet Tuesday. Officials planned to start coring for the McClosky at 3000 feet. Commercial production at this well will throw the city open to an intensive drilling campaign which will be unhampered, unlike other operations in the basin area, by mud. Movement of equipment to sites within the city will be able to proceed with little delay, whereas locations removed from roads are isolated.

Discouraging reports were received from two important wildcat tests in Wabash County, H. T. Martin's W. K. Wood 1, Section 31-1n-12w, Friendsville Township, 6 miles north of Mt. Carmel, was being plugged and abandoned after getting a hole full of water at 2408 feet. The only current operation in Jackson County, Stanolind Oil & Gas Company's Leiner 1, Section 20-7s-4w, Bradley Township, found salt and sulphur water at the deep St. Peter level. Some saturation was found at several upper horizons and ultimate fate of the wildcat was not immediately announced. Results similar to those obtained by the Stanolind Company's test were reached last summer by J. H. Forester's test a short distance to the northeast, near Du Quoin, Perry County, which also found salt and sulphur water in the St. Peter and was abandoned at 5153 feet.

The first deep test for Edgar County was being prepared by Stoves Brothers, contractors of Ownesboro, Kentucky, on the Roy Goodwin farm, 3 miles west of Paris and 2 miles south of Route 16. Drilling is to begin this week. It is on a tract of 50,000 acres leased by Michel Brothers and Douglas, of Evansville, Indiana, and is believed to be financed by Sun Oil Company.

The Centralia city council, which had previously indicated it would throw that community wide open to drilling contractors who wished to post a $100 license fee for each well, last week passed an ordinance limiting drilling to one well for each half-block. Drilling sections, or half-blocks, are to be determined by alleys. If production is obtained from more than one formation, a well for each producing sand may be drilled within each half-block. Contractors are required to pay $100 for a drilling permit and post a bond of $5,000. A total of 17 derricks had been completed within the city limits last week, compared to three ten days ago.

Leach Brothers' Albert Lee, Section 11-1s-10e, Albion Township, Edwards County, stopped drilling last week at 3092 feet, where a hard formation was struck, to set 5¾-inch casing. Fred Tribe, Edwards County Clerk, is circulating petitions addressed to the state conservation department asking that steps be taken to prevent pollution of the Little Wabash river by oil operations. The petitions point out that oil field wastage, if permitted to enter the river, might kill fish and provide a nuisance to communities using water from the river.

In Effingham County, Kingwood Oil Company's J. McWhorter 1, Section 15-6n-6e, Union Township, was drilling at 1200 feet. It is a deep test and the second of two wells the company agreed to drill when it took over a block of Union and Mason Township acreage. The first, Bartels 1, Section 26-6n-5e, Mason Township, was abandoned last November as dry at 4117 feet.

Favorable weather during the past week has given operators some encouragement, but many more days of sunny skies are necessary before fields and roads are sufficiently improved to allow satisfactory movement of equipment. Those familiar with Southern Illinois predict that wet weather will nullify gains made during the past few days before sufficient improvement is made.

ILLINOIS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CLARK COUNTY—		
Pierson & Yeager, Robinson 1	*	2555
CLINTON COUNTY—		
Adams Oil & Gas Co., Hefter 1	275	1370
Schmitz 3	109	1348
Phelps et al, Gubscher 1	*	1403
EFFINGHAM COUNTY—		
Hollis et al, Haarmann 1	*	2709
FAYETTE COUNTY—		
Ryan & Redgraves, Jones 1	*	1800
JASPER COUNTY—		
Obermayer et al, Adkins 1	*	260
RICHLAND COUNTY—		
Mammoth P&R Co., Bell 1	1930	3063
Heitz 5	13	3034
Johnson & Doran, Bristow 1	505	2975
Ohio, Arbuthnot 9	331	2965
Ritz Oil Co., Jenkins 1	205	3000
Max Pray et al, Rynyon 1	139	3121

*Failures; †Junked; ¶Million cu. ft. gas.

EASTERN FIELDS

Deep Ohio test hits four feet oil sand.

* * *

New gas field opened in New York.

Pittsburgh.—A deep test strike in the old northwest Ohio or Lima field and successful completion of a wildcat gasser in Allegany County, New York, highlighted Eastern Fields' activity of the week.

In the first deep test to be drilled in Seneca County, Ohio, in 25 years, A. J. West, Barnsville operator, encountered oil four feet in green sand at his Alex M. Clouse 1, which was bottomed at 2046 feet as the week closed. Location is near Tiffin and the well may be deepened slightly before completing. Bottom hole money from the Trenton limestone, which was at 1454 feet, was furnished by Sun Oil Company, holding leases on 50,000 acres in Seneca County and on 83,000 acres in adjoining Hancock County to the west. While official estimates on the discovery's production were lacking, the oil was described as of better grade than the usual product of the Trenton sand, or Lima crude. The Sun Company is expected to drill a number of tests in the vicinity this summer to supply crude for processing at its Toledo refinery 50 miles distant.

Belmont Quadrangle Drilling Corporation's Fred Hilligass 1, Beach Hill, Willing Township, about 12 miles southeast of Wellsville, Allegany County, New York, had an initial open flow of 11,500,000 cubic feet three feet in the Oriskany sand, topped at 4822 feet. Pressure was 1975 pounds. The wildcat is expected to be the forerunner of considerable new development in the Beach Hill district, as virtually all acreage is under lease. The Belmont Company capped the well and announced that no further drilling was planned for the immediate future, but that a pipeline would probably be laid to the well this summer. Two failures preceded the strike, one north of the discovery and the other southwest. H. C. Stroup, of Bradford, was the drilling contractor on the discovery.

Another Allegany County operation nearing completion is Empire Producing Company's Della Mulvey 1, which found the top of the Onondaga at 4713

feet and was bottomed at 4736 feet as the week closed.

Across the line in Pennsylvania, North Penn Development Corporation's Crawford 1, Keating Township, Potter County, which has been drilling for the past two years, was at 8145 feet, making fair progress with rotary after cleaning out junk 400 feet from the bottom. The White Medina sand is expected shortly, and this well will be the first to test this formation in this vicinity. The formation is productive of gas and oil in Ohio and of gas in Cattaraugus County, New York. It has been tested in various parts of Pennsylvania, but without production. The well was drilled to 6085 feet with cable tools, and is now being deepened by the first heavy duty deep well rotary rig to be brought into Eastern Fields.

In Posey County, Indiana, Carter Oil Company and Sun Oil Company prepared exploration programs for their extensive lease holdings in this area. R. M. English is in charge of a core drilling project being undertaken by the Carter company with equipment and crew moved in from Palestine, Illinois. T. C. Stauffer is in charge of a gravity meter crew conducting exploration work for the Sun Company. Meanwhile, Michel Brothers & Douglas' Lee Cronbach 1, Point Township, spudded in a week ago as the first test to be undertaken west of Mt. Vernon in the current campaign, was drilling below 300 feet. Drilling is by Jack Cox, Owensboro, Kentucky, contractor.

Minard Run Oil Company drilled its latest Music Mountain gusher, brought in a week ago near Bradford, through the Silverville sand, finding the highly profitable stray formation 15 feet thick. The fourth well to find flowing oil production in this formation since completion of Niagara Oil Corporation's discovery of last fall, it was the first to be drilled through the sand, topped at 1309 feet. Bottom of the hole, which awaits tubing, is 1327 feet. Minard Run Oil Company is erecting derrick for another test near storage tanks constructed for the firm's two flowing wells. The Niagara company, which also has two gushers from this formation, has another test drilling below 1000 feet, expecting the Silverville during the coming week.

G. E. Burgher, president of Bur Kan Petroleum Corporation, is reported planning a 5500-foot deep test for Gibson County, Southeast Indiana, which, if drilled, would be the deepest search for production to be undertaken in the state. Deepest well thus far drilled in this county stopped at 1870 feet. Burgher, who spent his boyhood in Gibson County, will make the test if a solid block of 3000 acres can be obtained.

In Vigo County, Indiana, the Carter Company was making a drill stem test of its Paddock 1, Section 16-10n-10w, at 2093 feet, the Devonian lime. In the extreme southeastern part of the state, Dearborn County, Dearborn Development Corporation's H. A. Bobrink 1, Section 16-6n-1w, was completed as a fair gasser for the state's sole completion of the week. It is the second successful gasser by this company in this area, and plans call for an extensive development program around Lawrenceburg and Aurora this summer.

Union County, Kentucky, which thus far has not entered the oil picture, appears to be in line for exploration within the next few months. About 20 firms and individuals have recently filed leases on approximately 600 farms with the county court clerk at Morganfield. Tests have been made in Crittenden County, adjoining Union County to the south, but with little success. Some success, however, has attended exploration efforts in Webster County to the southeast, where surface topography and rock formations are described as similar to those in Union.

EASTERN FIELDS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
OHIO		
ATHENS COUNTY—		
Gibson, Grosvenor 1	¶1.00	1026
D. T. Orndoff, Wooley 1	¶.07	1435
GUERNSEY COUNTY—		
Ohio FG Co., Hartley 1	¶.04	1525
HURON COUNTY—		
Patterson et al, Smith 1	*	525
KNOX COUNTY—		
Pure, Mavis 5	140	3170
LAWRENCE COUNTY—		
Portage Producers, Inc., Cambria Clay Products Co. 3	¶1.70	3008
LICKING COUNTY—		
Lacknett et al, Reynolds 4	15	775
Vandergrift Oil Co., Weigle 4	5	765
Settles et al, Shannon 4	2	730
Rutledge et al, Davis 1	¶.06	845
LORAIN COUNTY—		
Wm. Dempsey, Myers 1	¶.07	2400
MONROE COUNTY—		
H. B. Walker, Adams 2	*	1417
McCaslin 3	*	1620
MUSKINGUM COUNTY—		
Gas Prod. Co., Swingle 3	¶.63	4078
Wehrle Gas Co., Mikesell 1	¶.05	3200
STARK COUNTY—		
Ohio Insulator Co., Whitmyer 1	¶.26	3988
SUMMIT COUNTY—		
McCoy et al, Koontz	*	4320
Reed et al, Crawfis 1	*	4015
TUSCARAWAS COUNTY—		
East Ohio Gas Co., Duerr 1	¶1.70	4795
WASHINGTON COUNTY—		
Ray Dewitt et al, Fisher 6	4	868
Roby et al, Pitts 1	2	1975

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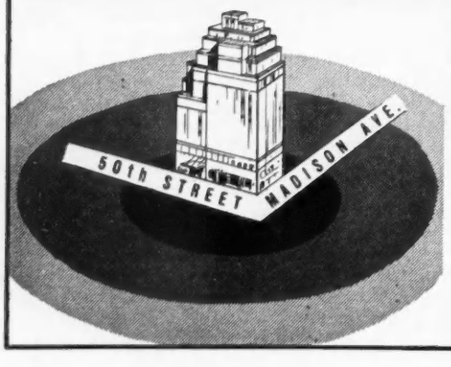

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West Virginia new drilling declines

Charleston, W. Va.—West Virginia drilling activity, as reflected in permits issued by N. P. Rhinehart, chief of the state department of mines, declined in January from both the previous month and the corresponding month of 1937. January permits totaled 46, a decline of 9 or 16.4 percent, from the 55 issued in December, 1937, and a drop of 14 or 23.3 percent, from the 60 issued a year ago.

January permits, by counties, follow: Boone 3, Cabell 4, Calhoun 2, Gilmer 12, Harrison 1, Kanawha 8, Lincoln 1, Monongalia 1, Pleasants 3, Putnam 2, Ritchie 4, Roane 1, Tyler 1, Wetzel 1, Wirt 1, and Wood 1.

Company, Well and Location	Init. Prod. Bbls.	Depth
WEST VIRGINIA		
CABEL COUNTY—		
Burnie Curry, Morris 1	¶.20	1403
GILMER COUNTY—		
Pittsburgh & W. Va. Gas Co., Moffett 7608	¶3.82	1440
Glen Bush, King 1	¶.22	1647
KANAWHA COUNTY—		
Pure, Williams Coal 274	6	3302
Linden Drlg. Co., Maiers Hrs. 1	¶19.89	4828
United F. G. Co., Gibson 4764	¶11.16	4985
Fisher 4786	¶9.30	4845
Johnson et al 4780	¶4.31	4825
Joe Rubin, Smith Hrs. 1	¶7.60	4927
Everett Starcher, Drake 1	¶	5230
LINCOLN COUNTY—		
Guyan Oil Co., C. & O. RR. 2	50	1475
MARION COUNTY—		
Hope Nat. Gas Co., McHall	*	3297
MARSHALL COUNTY—		
Fox & Frey, Phillips 1	¶	1870
PLEASANTS COUNTY—		
Sud Powell, Cox 2	10	1880
W. C. Patterson, Patterson 2	*	1573
PUTNAM COUNTY—		
Smith et al, Gibson 1	¶.64	1025
RITCHIE COUNTY—		
McBurney et al, Echard 1	¶	2315
TYLER COUNTY—		
Roe Oil Co., Brooks 1	2	750
WIRT COUNTY—		
Smith & Kerns, Nutter 1	4	2216
KENTUCKY		
DAVIESS COUNTY—		
Grimes et al, Petrie 8	1	535
FLOYD COUNTY—		
Hamilton, Hatcher 76-D	¶2.96	1679
Kentucky W. Va. Gas Co., Smith 563	¶.53	1951
J. I. Stepp 5	¶.17	2490
Fred Williams, Stanley Hrs. 5	¶.10	2790
Honaker 2	*	....
HANCOCK COUNTY—		
Walker et al, Boling 6	*	....
KNOTT COUNTY—		
Warfield Nat. Gas Co., Jones 4772	*	....
LEE COUNTY—		
Thomas Witmer, Tipton 8	5	538
MARTIN COUNTY—		
Hale et al, Hardin 1	.30	2803
MUHLENBERG COUNTY—		
J. C. Ellis, Kennedy 4	3	1655
OHIO COUNTY—		
Western Kentucky Pet. Corp., Mosley 2	*	997
H. A. Henry, Chambers 5	*	666
INDIANA		
DEARBORN COUNTY—		
Dearborn Development Corp., H. A. Bobrink	¶	....
PENNSYLVANIA		
GREENE COUNTY—		
Equitable Gas Co., Smith Fuller 1	¶.13	3104
JEFFERSON COUNTY—		
F. C. Deemer, Verstine & Kline 1	*	7155
WARREN COUNTY—		
Updegraph, O. E. Erickson 1	*	4830
NEW YORK		
ALLEGANY COUNTY—		
Belmont Quadrangle Drilling Co., Fred Hilligass 1	¶11.50	4825

*Failures; †Junked; ¶Million cu. ft. gas.

MICHIGAN FIELDS

Rush of locations in anticipation of thaw.

* * *

Proposed line outlet for Edenville held up.

Mt. Pleasant, Mich.—In a burst of activity 17 locations in the new Edenville, Midland County, play become active this week, chiefly as the result of deals and a move on operators' part to beat the anticipated March thaw and rainy season.

Mammoth Producing & Refining Corporation announced purchase of Michigan Devonian Petroleum Company's 3/8th interest in the discovery well and 320-acre discovery drilling block as well as 1350 acres in Edenville and Jerome township. Price of this transaction was not officially disclosed but it was variously reported from $100,000 to $250,000 in cash, as well as over-rides on some outlying leases. This deal bid fair to put the purchaser in top position in the play in so far as independent operations are concerned. The company previously had leased the west 40-acre offset to the discovery and later closed a deal securing the north 80-acre offset lease jointly with Garfield Petroleum Corporation.

Mammoth Producing & Refining Corporation is drilling on the west and north offsets to the discovery and building rig on four other locations.

Gordon Oil Company was the successful bidder for Carter Oil Company's 199-acre block, just a half mile east of the discovery. M. L. Jorgensen and Bell & Marks, Inc., also closed deals for leases close in the play and started moving in material.

So far pipe line companies have been unable to give material relief for production of the discovery well, Chapman Oil Company et al's State 1, Section 27-16n-1w, 850 barrels initial in Dundee lime early in February, due to several reasons.

Both Simrall Pipe Line Corporation and McClanahan Pipe Line Company are operating truck loading racks from the lease, but deliveries have averaged less than 300 barrels daily.

What loomed as immediate relief was temporarily at loggerheads this week. Simrall Pipe Line Corporation announced negotiations with the Pure Transporation Company, for purchase of the latter's Buckeye system, which includes a 30-mile 6-inch between the Buckeye field and Simrall's 8-inch into Mt. Pleasant and to Toledo, Ohio.

Pure's Buckeye 6-inch lays within 5 miles of the Edenville discovery well. Simrall started to lay the connecting five miles last week but called a halt to operations when a hitch arose in negotiations. Meanwhile, Simrall also has temporarily halted preliminary work on the proposed 13 miles of 6-inch from Greendale pump station to the Edenville discovery, pending outcome of the Pure deal.

Considerable interest continued to focus this week on S. B. Hood's Wright 1, Section 9-3n-13w, semi-wildcat in Allegan County, which flowed wild about 250 barrels in 8 hours two weeks ago, at 1610 feet, Upper Traverse, before the producing casing string had been run. Fire followed, destroying the drilling machine. Operators expected to have casing set and tankage up for a test this week.

Hopes for the Secord, Gladwin County district, 9 miles northeast of the Buckeye field, were brighter this week, when Sun Oil Company's Conrad 1, Section 12-19n-1e, east offset to the discovery well, averaged about 45 barrels daily on a 4-day pump test before acid treatment. Conrad is producing from Dundee limestone at 3444 feet. Dry holes previously had been drilled, on the north offset, a mile west and a quarter mile northeast of the discovery.

MICHIGAN
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ALLEGAN COUNTY—		
A. Stellard, Schafer 1, se nw nw 29-3n-12w	*	1625
Fletcher Carscallen, Van Dam 1, se nw sw 3-4n-14w	*	1935
Ross & Vale, Bredwig 1, nw sw sw 15-4n-13w	lcn.	abd.
Muskegon Oil Corp., Goodman 3, nw nw nw 22-4n-13w	400	1561
Lima Oil Corp., Nahr 2, nw se nw 22-4n-13w	100	1582
Andrew Hoyt, Harris 1, nw sw nw 1-1n-13w	lcn.	abn.
ARENAC COUNTY—		
Sterling Drilling Co., Kline 1, nw nw sw 19-19n-4e	*	3017
GLADWIN COUNTY—		
Mammoth P&R Co., LaFurgey 1, sw sw ne 20-17n-2e	80	3558
Lake 1, se sw se 20-17n-2e	60	3546
Gulf's State 1, se se sw 20-17n-2e	95	3530
Jones & Rose, State B-2, ne nw se 20-17n-2e	65	3555
Sun's Strohkirch 10, sw sw sw 3-18n-1w	412	3664
Conrad 1, nw nw sw 12-19n-1e	55	3444
J. V. Wicklund, State J-1, nw se ne 13-18n-1w	60	3637
S. S. Oil Co., Fitzwater 3, ne se ne 26-18n-1w	350	3592
Rex Oil Co., Auer 1, c e½ ne se 22-18n-2e	*	3447
ISABELLA COUNTY—		
Wicklund Dev.., Skarrit 3, ne ne se 5-14n-6w	110	3709
MECOSTA COUNTY—		
Sun, Robart 1, ne nw 29-16n-7w	*	3830
MIDLAND COUNTY—		
Sun, Consumers 1, ne ne ne 9-16n-1w	*	4101
OTTAWA COUNTY—		
Sutherland Drilling Co., Brandt 1, ne nw ne 36-5n-14w	*	1708

*Failures; †Junked; ¶Million cu. ft. gas.

When Will WAR Be Declared?

Only children and fools doubt for one moment that WAR is inevitable.

Only one thing can make Uncle Sam keep his army and navy at home. Only one thing can save your boy from a horrible death. Only one thing can save this country from bankruptcy and chaos.

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Oklahoma

[*Continued from page 81*]

show was from 4190 to 4220 feet in a sand of Deese series. The test was drilling below 4289 feet.

Eleven miles east of Tulsa, work is being revived in an old shallow Bartlesville and Burgess sand area, opened more than 20 years ago. Marshall Brothers' Seifert 1, CSL NW SW 9-19n-14e, was drilling below 475 feet and Lamberton's Caldwell 1, SEc NE 8-19n-14e, was drilling below 400 feet. Well which opened the area is in SWc NE 8-19n-14e, and is still making about 3 barrels of oil daily from Burgess sand. Another test was spudding at Haynes' Harvey 1, SWc NW 9-19n-14e. It is expected development of the area will be rather extensive but spotted, due to lenticular occurrence of the sand body.

Stanolind Oil & Gas Company and Amerada Petroleum Corporation's Ridgway 1, NWc NE 24-3s-9e, south of Boggy Depot in Atoka County, was drilling below 2500 feet. The test had Hunton lime at 2369 feet; Sylvan shale at 2373 feet and cored from 2417 to 2424 feet for a 4-foot recovery of lime showing stains of black oil.

Another test was starting in the Citra area of Hughes County. It is E. H. Moore's Hunter 1, NEc NW 31-4n-9e, and when last reported was drilling below 1100 feet.

Seven miles south of the Hoyt pool in Lincoln County, Stanolind Oil & Gas Company's Strader 1, NWc NE 8-13n-3e, was drilling below 4300 feet. A core from 4250 to 4267 feet had a full recovery of sandy shale with nothing showing.

Oklahoma City Sector

An important wildcat in this part of the state was being plugged last week. W. O. Allen et al's Jackson 1, CE½ NW NE 6-14n-3w, 4 miles north of Edmond pool, Oklahoma County, drilled to 6746 feet in second Wilcox sand which it found white and dry. Top of the first sand was at 6609 feet with the second member topped at 6695 feet. A core was taken to 6798 feet, but tests revealed water in both sands. It had a small show of oil in a core at 6620 feet.

Harper & Turner's Sears 1, CWL NW NW 13-9n-2w, southeast of Moore pool in Cleveland County, had top of the Wilcox sand at 7550 feet and drilled to 7590 feet in hard white sand with no show of oil or gas. A test was to be made before drilling further.

A completion at the west edge of the Billings pool, Noble County, was Continental Oil Company's Conway 3-A, NWc 16-23n-2w, which drilled to 4281 feet in Wilcox sand. It made a potential of 2448 barrels of oil and 3,500,000 cubic feet of gas. The company has made location for Conway 15, NE SW SW 16-23n-2w, due west of Conway 13, which made a potential of 3672 barrels of oil.

Stanolind Oil & Gas Company and Amerada Petroleum Corporation's Blunt 1-B, CW½ W½ NW 26-15n-3w, was shut down for orders at 5930 feet (plug-back) after it had bailed and showed a little gas. The test is south of the Seward pool of Logan County.

In the Lamont pool of Grant County, Carter Oil Company et al's Barclay 1, CEL SE NE 17-25n-3w, set another plug at 5437 feet after the first failed to seat. The test topped Wilcox sand at 5442 feet and after running 7-inch casing to 5550 feet, perforated between 5488 and 5490 feet. It showed salt water when bailed. Total depth was at 5555 feet. Carter Oil Company's Crisman 2, CEL NW NW 16-25n-3w, was spudding at 160 feet.

In the Langston area of Logan County, Arrow Drilling Company was bailing below 3600 feet at Dobson 1, NWc 23-17n-1w, after drilling plugs. It is at a total depth of 5234 feet.

Ardmore District

Deeper drilling for the old Hewitt field of Carter County was started last week as The Texas Company started rigging up at Cathey 1, SE NE NE 6-5s-1w. The well was completed October 8, 1936, after drilling to 4559 feet and plugging back to 4375 feet. It produced 101 barrels of oil initially. Oil is coming from around 4350 feet where the hole filled 1000 feet with oil at the start of production. Daily production has amounted to about 9 barrels daily since its completion. The company has also made location for a test nearby, Dolman 1, SE SW NW 6-5s-1w, which will probably go to around 7000 feet in the Ordovician.

Probabilities are that Gulf Oil Corporation will plug back at Smith Estate 1, CSW SW 26-2s-3w, in the Oolitic lime area of Carter County. The test was drilled to 7920 feet and during a 24-hour test, flowed 81 barrels of oil and 71 barrels of water through a 1-inch choke on tubing set at 7776 feet.

There were 12 oil wells completed in Oklahoma last week for an initial production of 2891 barrels of oil. Four gas wells made 9,335,000 cubic feet of gas and there were 8 dry holes.

First reports fell off to 21 as compared with 44 two weeks ago. Pottawatomie County had 4, Seminole 3, Lincoln, Okmulgee, and Payne two each, and Caddo, Carter, Creek, Garvin, Hughes, Okfuskee, Osage and Pontotoc counties had one each.

Bell Oil acquires nine leases in Burkburnett

Wichita Falls, Texas.—Stripper-well production held by Continental Oil Company in the old Burkburnett district, involving nine fully equipped leases doing 110 barrels daily, has been sold to Bell Oil & Gas Company. An extensive crude gathering system was also acquired by the latter and tied into the system that serves its refinery, located across the state border at Grandfield. Some of the oldest wells in the Burkburnett area were included with the 65 pumpers and 17 additional wells, listed as temporarily abandoned or as being used as key wells for gas repressuring. The wells produce from sands between 500 and 1900 feet deep. Continental Oil Company retained deep rights under the surrendered leases.

Humble contemplates new addition to home office

Houston, Texas.—Faith in the future of the oil industry as well as of the Humble Oil & Refining Company is reflected in the tentative plans of that company to build a 9-story addition to its large office building at Houston.

Architects have been commissioned to prepare preliminary plans for the addition. The company 2 years ago built a 14-story tower addition to the main 9-story building, and with the proposed further addition, the building would cover, with 9 stories or more, all but a small area of a full city block. That remaining portion, also owned by the company, at present has on it a 3 story building that the company occupies.

The proposed new portion, like the main building and tower addition, would be air-conditioned, and would conform architecturally with the whole structure.

GEORGE BRAKE, for many years engaged in production activities in South America, last week became production superintendent for Davies Petroleums, Ltd., operating company in Turner Valley, Alberta.

Semitropic well making oil from Pliocene

Los Angeles.—The first Pliocene oil ever produced from the floor of the San Joaquin Valley was recorded during the week by Standard Oil Company of California's Randolph Community 2, Section 14-27-23, in the Semitropic field. The well, bottomed at 7400 feet, also has the distinction of being the first to ever produce oil in Semitropic field, which hitherto has yielded only gas.

A mass meeting of California's independent oil operators and refiners in session March 4 may determine future oil curtailment policies for more than 60 fields in that state.

With A. C. Mattei, Honolulu Consolidated Oil Company, presiding, the gathering was considering the measure "California Oil and Gas Conservation Act of 1918." It was proposed that three commissioners be appointed to administer the measure if such is made a law by the legislature this week.

An oil crisis has been declared in California due to excessive crude production threatening price stabilization and employment.

CALIFORNIA

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BELRIDGE—		
Belridge Oil Co., No. 8	350	8540
CANAL—		
Shell, KCL A-72	2208	8210
EL SEGUNDO—		
Apex Pet. Co., Converse 1	1121	7410
Ohio, A. S. Gough 11	714	7373
Standard, Refinery 8	1813	7275
GRAPEVINE-WHEELER RIDGE—		
Universal Cons. Oil Co., No. 1	227	4988
LONG BEACH—		
Jergins Trust, No. 21	240	4487
RICHFIELD—		
Union, Chapman 29	235	4440
SANTA MARIA VALLEY—		
E. H. Moore, Inc., Union Sugar E-13	72	5527
Signal O&G Co., Ramalho 2	6096	4756
TORRANCE—		
Anderson, Neil, Well 2	150	5050
Fisher & Johnson, Watkins 1	200	5148
VENTURA AVENUE—		
Tide Water Assoc. Oil Co., Hartman 18	920	10090
WILMINGTON—		
General, Blinn (LB) 2	299	3270
Ford (LB) 34	3727	4075
Ford (LB) 37	2400	4100
Hancock Oil Co., Harbor (LB) A-2	5309	4014

*Failures; †Junked; ¶Million cu. ft. gas.

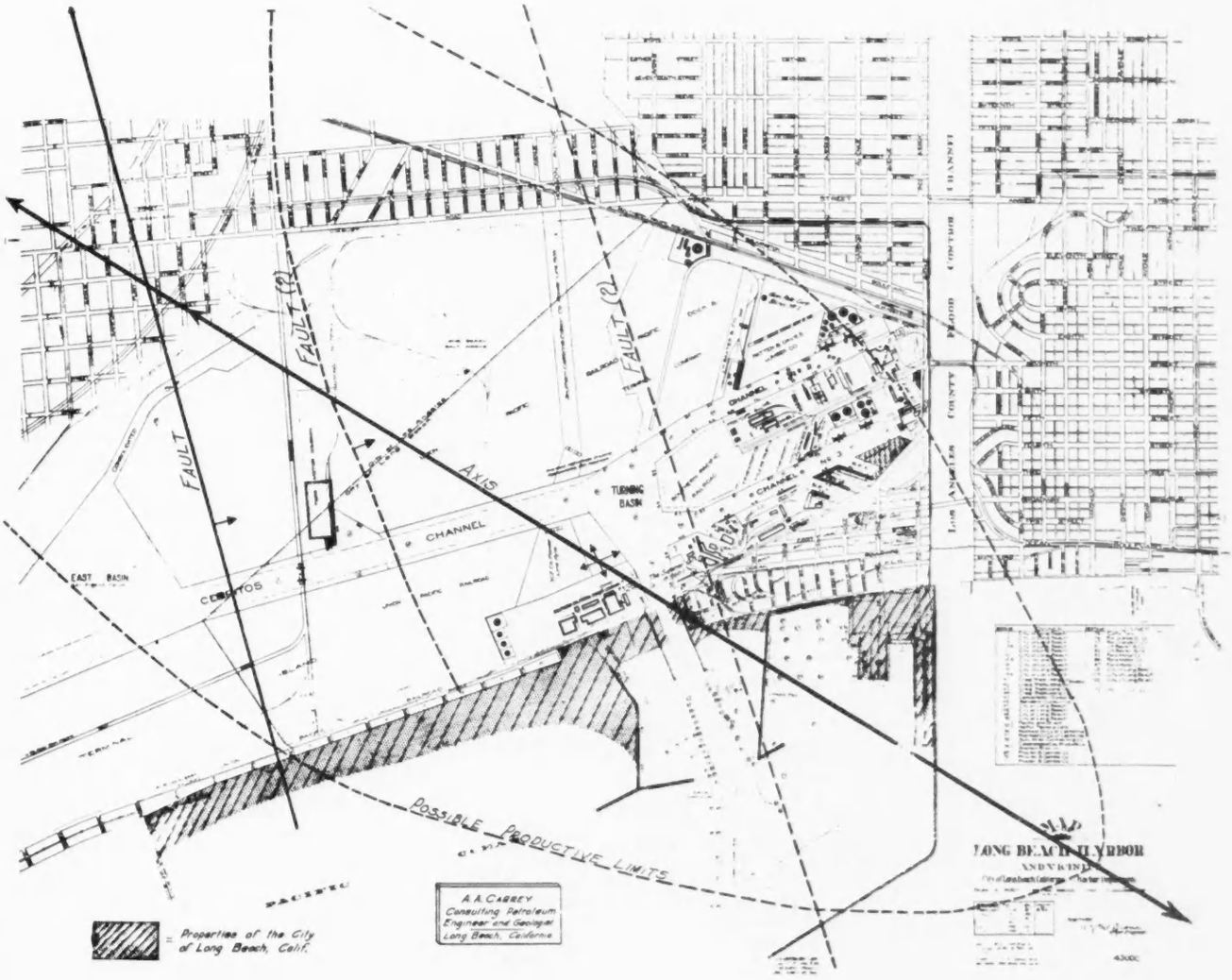
The Wilmington Field

By A. A. CARREY, Consultant Petroleum Engineer and Geologist

A paper presented extemporaneously under title of "Harbor Drilling Problems," before the Los Angeles Basin Chapter of the American Petroleum Institute, Division of Production, on January 11, 1938.

THE City of Long Beach finds itself in the unique position of having a portion of two major oil fields within its corporate boundaries, the first being the world famous Signal Hill which has been producing since 1921 and now the major portion of the newly discovered Wilmington field, which will lie within the Harbor district of the City of Long Beach. The Long Beach Harbor is one of major importance on the coast of California and has undergone, in the past few years, an enormous amount of development and increased importance is being placed on the Long Beach Harbor by shipping interests all over the world. The development of the newly discovered oil field must be synchronized with and included within the area of principal development of the Long Beach Harbor. Many problems confront the City of Long Beach in its earnest attempt to allow the proper and orderly development of an oil field within the harbor boundaries. We who have been in the oil business in Long Beach, have thought at times in the past that perhaps the various city administrations did not give the oil industry the consideration due. I have been engaged as consultant and advisor to the City of Long Beach and the Board of Harbor Commissioners for the past seven months and have found a complete unity of purpose and cooperation between the present city administration, the city attorney, the Board of Harbor Commissioners and the oil industry. The Board of Harbor Commissioners of the City of Long Beach have jurisdiction over the area that will comprise the Long Beach portion of the Wilmington oil field. To them has fallen the difficult task of preparing the proper ordinances and restrictions necessary to allow oil development, as well as continuing with their well-planned program of harbor development and expansion. The Board of Harbor Commissioners is comprised of five members appointed by the City of Long Beach. These men were chosen from the business men of the city and are well aware of the many serious problems which confront their board due to the discovery of oil within the territory under their jurisdiction. The city will derive enormous revenues from a source heretofore uncontemplated and will, as a result, be in a better position to develop and expand its harbor facilities at some future date. The city by virtue of owning large acreage within the proven area of production will undoubtedly receive an enormous income that can be applied to harbor bond redemption and the decrease of city taxes to its citizens.

The city acquired from the State of



California by grant in 1911, all the tide lands, whether filled or unfilled, lying within the boundary of the City of Long Beach. These tide lands include approximately two and one half miles of beach frontage, and various channels now used for navigation purposes. The final determination of titles confronts the city with one of its greatest and most important problems. There are many claims being made to the various lands by the State of California, certain corporations, and individuals. The title situation becomes greatly involved because the titles must be traced from Spanish grants on through the years to their present owners. Considerable litigation will undoubtedly be necessary to untangle and prove the validity of any and all claims that exist at this time.

The Wilmington oil field was discovered by General Petroleum Corporation upon the completion of Terminal 1, in December of 1936. All of the development took place within the boundary of the City of Los Angeles and proceeded in a northerly and northwesterly direction. It is with a great deal of satisfaction to the many engineers and geologists that the discovery was based primarily upon the interpretation and use of geophysics in determining that a structure existed in this area. Credit must also be given to General Petroleum Corporation in the very efficient manner and modern methods used in the drilling of the first well. As a result of the completion of the first well a major drilling campaign immediately followed and approximately 200 wells have been drilled within the Wilmington area. It soon became evident that a large portion of this field would extend in a southeasterly direction across the boundary between the City of Los Angeles and the City of Long Beach. On June 15, 1937, by a vote of the people, the Long Beach area was opened for the drilling and development of oil. The ordinance provided for the drilling of one well to the acre and followed along the lines of the present state law that provides for the drilling and operating in new fields. The Board of Harbor Commissioners was immediately called upon to prepare ordinances and restrictions necessary for the protection of the city's interests. Harbor Ordinance No. 22 was passed and is at this time being adhered to by all operators in the Long Beach area. There has been considerable comment about certain sections of the ordinance. It is true that some of the sections seem to place an unnecessary burden upon the oil industry. However, when the increased hazard to property and shipping is considered because of the oil development, one can readily appreciate the position in which the board is placed in its promise to the people to protect their interests. The restrictions deal primarily with safety regulations and the prevention of damage from fire, blow-outs, and any damage that might hinder shipping or the operation of an active harbor.

The portion of the Wilmington field within the boundary of the City of Long Beach is owned or leased principally by major oil companies and very few independent companies are represented. All companies represented in the area are favorable towards an orderly development program and it is reasonable to believe that in the production of oil they will adhere to a program that will not cause a "break down" in the oil industry in the Los Angeles Basin. All of the operators are adhering to the use of advanced surveying methods and all engineering principals that are conducive to a well drilled and orderly development program. A committee of engineers has been appointed by the operators represented in the area to assist in carrying out such an orderly program and to determine the best methods of production in respect to the various zones that are known to exist within this field.

The structure of the Wilmington-Long Beach field is an anticline with a northwest-southeast trend and is a portion of the major uplift upon which the Torrance field was discovered and developed. The uplift continues southeasterly into the Pacific Ocean. The structure is one of very flat dips and the area of accumulation will be extensive. It appears at this time that there are at least two, or possibly three cross faults, that occur in a more or less north-south direction and will undoubtedly cause the accumulation within the structure to be divided in three segments. Considerable evidence has already been found in the Long Beach area of the existence of faulting. However, due to the limited number of wells drilling at this time it is impossible to determine or trace these faults with any degree of accuracy. From the development to date it appears that all of the zones discovered in the Wilmington area will also be present in the Long Beach area. The most concentrated drilling in the Long Beach area is occurring in the vicinity of the entrance channel to the Long Beach harbor and is extending easterly and northeasterly. The wells that are drilling on the east bank of the entrance channel have intersected the Tar zone, the Ranger zone and the Terminal zone at a higher startigraphic position than any of the wells in the "Wlmington" or "Ford" areas. The wells that are drilling near channels two and three are apparently lower on the structure. Sufficient evidence has been obtained at this time to tend to show that the axis of the structure will be located in a northwest-southeast direction and will continue from the Ford plant area southeasterly to the Long Beach entrance channel. Superior Oil Company No. 1960, Community No. 1, has been found to intersect all zones higher than any well drilled heretofore in the entire Long Beach and Wilmington area. They have also proven the existence of accumulation in the Upper Tar zone, the Ranger zone and the Terminal zone. It appears that Allied Petroleum Company's No. 23, located near the intersection of Broadway and Santa Clara Avenues, is considerably down structure from Superior Oil Company's No. 1960 well and that it will be productive in the Ranger zone. It drilled to a sufficient depth to intersect the top of the Terminal zone and found water sands that might preclude possibilities of production from the Terminal zone at this position on the structure. General Petroleum Corporation's Channel 3, Community No. 3, and General Petroleum Corporation's Blinn 1, found a similar condition of accumulation in the Ranger zone as did Allied Petroleum Company's No. 23. This development more or less conforms with the conditions of accumulation as they are found in the Wilmington area, that is, that the Ranger zone covers the greatest area and will be productive in certain areas in which the Terminal zone will probably be incapable of production. The apex, or highest point on the structure, will undoubtedly be in the Long Beach area and it is reasonable to expect that it will be in the vicinity of the entrance channel to the Long Beach harbor. As the development progressed in the Wilmington area southeasterly, the gravity of the oil in the zones produced increased and it is reasonable to expect that the Long Beach area should produce oil of even higher gravity than the area commonly known as the "Ford Area." Cores from the wells along the entrance channel indicate that a very good quality of oil can be expected from these wells. There are no wells on production in the Long Beach area at this time. The Board of Harbor Commissioners of the City of Long Beach has received applications for the drilling of 109 wells, permits for the drilling of 45 wells have been granted, and at this time there are 14 wells in the process of drilling, with only 3 of them of sufficient depth to prove the existence of accumulation in the Terminal zone. Superior Oil Company's No. 1 intersected the Upper Tar zone at 2100 feet; the top of the Ranger zone at 2338 feet; and the top of the Terminal zone at 2858 feet.

Electrical logs are showing that the structure in the Wilmington and Long Beach field is more complex as the work progresses. It appears that there is an unconformity between the top of the Tar zone and the top of the Ranger zone. The Tar zone is present in the Wilmington and Ford area but seems to have been cut out in the Long Beach area. However, in the Long Beach area an Upper Tar zone is present that was not saturated in the Wilmington area. The unconformity of the section at the top of the Ranger zone seems to be more or less consistent with the Wilmington and Ford areas. The wells that are drilling in the Terminal zone at this time have penetrated approximately 700 feet of Terminal zone and it is my belief that there will be at least 1100 feet of total penetration in that zone. It also appears that the sands thicken in the Long Beach area and this should be conducive towards bigger wells than those drilled in the Wilmington area. No wells at this time contemplate drilling to depths sufficient to determine the productivity of the so-called "Deep" or "Ford zone." This zone should occur on structure in the Long Beach area at about 5000 feet. By mutual agreement between the operators it is agreed not to develop this zone until some future date.

It has been agreed between the operators to produce the total thickness of the Terminal zone. I believe this to be a good decision because it will avoid the occurrence of several drilling campaigns that might occur by operators wishing to penetrate deeper into the zone. It is also the wish of the operators to place the Ranger zone behind blank pipe and not produce

this zone until some later date. It is questionable whether this program will be adhered to since some of the operators would like to produce the Ranger zone as well as the Terminal zone at this time.

The casing program that seems to be generally adhered to in the Long Beach area is the landing and cementing from 200 to 300 feet of 18⅝-inch surface pipe; a string of 13⅜-inch or 11¾-inch at the base of the second shale which lies directly over the Ranger zone; and then completing with an 8⅝-inch string of casing perforated in the Terminal zone; a combination cement job at the top of the Terminal zone and over-lapping the blank pipe up and into the primary water string. In the event that the operators decide to produce both the terminal and the Ranger sands in any one well, they will undoubtedly place their tubing in the hole with a packer so set as to produce the Terminal zone through the tubing and the Ranger zone be allowed to flow between the tubing and the 8⅝-inch casing. At this time there does not seem to be any serious obstacles in the way of operators disposing of their oil. There are several crude buyers who show a willingness to purchase crude oil, and gasoline companies are laying pipe lines for the handling of gas.

A serious problem confronts the operators in this field and it can only be hoped that they will realize its seriousness, and prevent its disastrous occurrence by adhering to a strict curtailment program. It can only be hoped that the operators will agree upon a program of production that will not jeopardize the price structure for crude oil in California. The placing of an enormous quantity of this quality of oil upon the open market may result in serious damage and an enormous loss to the oil industry. The City of Long Beach has approximately 200 acres of oil lands that will be developed and I might state that the City of Long Beach is in complete sympathy, and will cooperate to the end in abiding by any curtailment program that will enable the city as well as all other operators to derive a maximum revenue from their production and not cause a general break down in the price structure for oil in California. It has been found by experience that the natural reservoir provided by nature is the best and cheapest method of storing oil, and since there is a possibility of overproduction by the development of this large oil field, it would certainly behoove all of the operators in this field to agree to a conservative and practical program for the extraction of oil according to the needs of the industry. Not only would curtailment be beneficial to all concerned, but it would enable the operators to extract more oil by conserving the gas and maintaining pressure that is conducive to longer lived production.

It was found in the Wilmington field that the wells were subject to considerable sand movement with the production of their oil. A curtailment program would minimize the danger that is always present in fields which have sand troubles accompanying the extraction of oil. By maintaining back pressure on the wells, sand trouble should be eliminated for a considerable length of time. The time will come, however, when these wells will cease to flow and it will be necessary to place them on the pump. The wells on the pump in the Wilmington area are experiencing increasing difficulties with sand in the production of their oil. The sand conditions are peculiar to the field, and it is reasonable to expect the same conditions will exist in the Long Beach area. Methods for the handling of the sands in the production of oil appears to me to be one of the most serious problems that will confront the operators some time in the future in this field. It can only be hoped that in time to come more efficient and improved methods can be developed by concerns who are interested in efficiency in pumping and production methods, and that they will be able to furnish the industry with a practical method for the extraction of oil under adverse sand conditions.

In conclusion I wish to draw your attention to the fact that the Long Beach portion of the Wilmington oil field is in its first stages of development and that undoubtedly many conditions will arise and facts be determined that cannot be foreseen at this time. I have merely attempted to trace the development as it is at this time and purvey to you some of my personal opinions of conditions as they may occur at some time in the future.

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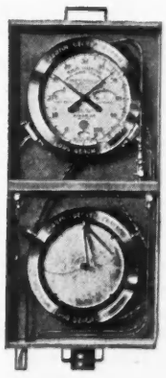

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IMPORTANT WILDCAT TESTS

ARKANSAS

BRADLEY COUNTY — Phillips Pet. Co.'s Splawn 1, ne sw 9-16-11, dk and mir.

CLAY COUNTY — Canadian American Oil Co.'s Smith 1, c ne nw 9-20-8, elev 375 ft, top Nacatosh 800 ft, sd 1005 ft shale.

CLEVELAND COUNTY—Marwick & Olds' Aubrey Vance 1, nw nw 18-11-11, dr 890 ft.

CRITTENDEN COUNTY—Manning & Martin's Cartwright 1, se nw sw 16-7n-8e, sd 4230 ft sand and shale.

CALHOUN COUNTY — J. R. Lockhart's Hearnesberger 1, 16-11-13, rur.

COLUMBIA COUNTY — Kerr-Lynn Oil Co.'s Barnett 1, se sw ne 14-17-20, elev 321 ft, top Permian lime 7618 ft, cored sat. lime 7659-64 ft, set 7-in csg at 7051 ft where it hung, dr plug, showed sw, ran electrical tester, cemt 5-in csg on bottom, td 7730 ft. Standard of La.'s Bodcaw Lbr. Co. 1, c se ne 18-16-22, elev 253 ft, base massive anhydrite 3422 ft, top Travis Peak 4312 ft, dr 6808 ft; Crone 1 (formerly D. E. Thomas 1), c nw se 8-16-22, elev 271 ft, top anhydrite 3288 ft, dr 6004 ft; W. P. Phillips 1, se 15-17-19, 9⅝ csg cmtd 2970 ft, woc, td 2986 ft. E. O. Olds' Mary Dennis 1, nw se sw 4-17-21, elev 296 ft, owdd, td 4513 ft.

DESHA COUNTY—Columbian Fuel Corp.'s Victoria Cross 1, sw sw 34-8s-3w, spd.

HEMPSTEAD COUNTY—Easton, May & Murdock's R. M. LaGrone 1, ne ne 5-12s-26w, pb to 1000 ft, sdtr 1400 ft, old td 2944 ft.

JOHNSON COUNTY—Ark. La. Gas Co.'s Hudson 2, se nw 14-10-24, mim.

LA FAYETTE COUNTY—Lyons & Neely's Lillian Taubel 1, (Tatum fee), c se nw 18-16-22, elev 252 ft, top first anhydrite 3279 ft, top massive anhydrite 3298 ft, top lower Travis Peak 5307 ft, sw abn, td 7282 ft. L. E. Tennyson, Jr.'s Fee 1, sec nw ne ne 13-16-23, mim.

LITTLE RIVER COUNTY—Henan & Coe's W. D. Waldrop 1, sd 1960 ft. J. G. Strahan et al's Dierks Lbr. Co. 1, sw se 21-12-28, coring 2320 ft.

LONOKE COUNTY—J. W. Eddington et al's Anderson 1, nw ne 7-4-9, spd.

MILLER COUNTY—F. F. Earles' General American 1, sec sw 20-14-26, lcn under water.

UNION COUNTY—E. G. Bradham's S. L. Robbins 1, sw ne 12-19-16, rur.

CALIFORNIA

CIERVO—Superior's Ciervo Unit Plan 1, 20-16-13, dr 5010 ft.

CLOVIS—Central Valley Oil Co.'s Well 1, 1-12-20, sd 511 ft.

COALINGA—J. M. Conlon 1, 25-19-14, sd 100 ft. Petroleum Sec. Co.'s Gatchell No. 2, 18-20-16, dr 5956 ft brown shale. Shell's 36-1, 36-19-14, rig; Conlon 1, 30-19-15, dr 1625 ft. J. F. Wilcox's 6, 11-20-14, sd 310 ft.

EAST COALINGA—Pure's S.P.L. Co. 1, 31-18-17, dr 10,667 ft.

JACALITOS HILLS—Jacalitos Pet. Co.'s 1, 14-21-15, redr 5547 ft.

PANOCHE HILLS—Panoche Hills Oil Co.'s 1, 12-14-11, portable rig, sd.

ARVIN—General's Pauley No. 1, 22-31-29, sd 500 ft. Petrex, Inc.'s 1, 32-31-30, fsh drill pipe 3625 ft. Union's Berry 1, 15-31-29, dr 3124 ft.

BELLEVIEW—Continental's KCL D-1, 10-30-26, dr 7350 ft. Superior's KCL 9, 3-30-26, redr 7050 ft.

BELRIDGE—General's St. Helens 1, 12-28-20, dr 7815 ft. Ohio's Ford 1, 6-29-22, td 2030 ft, rigging to deepen. Shell's Voight 1, 32-27-20, lcn.

BUENA VISTA LAKE—Ohio's KCL A-8, 32-31-26, dr 8254 ft.

DEVILS DEN—Amerada's Beer 5, 22-26-19, running csg 6803 ft.

DOMINION—Ring Oil Co.'s KCL 1, 16-26-28, abd 1315 ft. George W. Dean's Dean 1, 26-26-28, rig. F. M. Pottenger's Orcier 1, 34-25-28, abd 1290 ft.

EDISON—G. W. Johnson's Brown-Pallette 1, 33-29-30, sd 1021 ft. Ray W. Stevens' 1, 22-30-30, rig. Wood-Callahan Oil Co.'s Porter No. 1, 20-30-29, dr 300 ft.

FRUITVALE—Shell's KCL A-58, 29-29-27, dr 5422 ft, gray sand and shale.

GRAPEVINE-WHEELER RIDGE—Petrol Corp.'s Reserve-Petrol No. 32-2, 32-11-19, suspended 6019 ft. Richfield's KCL No. 1, 28-11-20, foundation. Universal Cons. Oil Co.'s Well No. 1, 33-11-19, td 4988 ft, recompleted 227 bbls daily.

LERDO—Standard's KCL 18-1, 29-28-26, rig. 1245 ft; Chaflin 2, 10-27-27, dr 1376 ft. Desert Glow Oil Co.'s 3, 14-27-27, rig. Framac Oil Co.'s Brown 3, 22-27-27, co 1351 ft.

McVAN—Hobee Oil Co.'s McVan 3, 14-27-27, sd 1185 ft. Scottell Oil Co.'s 1A, 14-27-27, lcn.

POSO CREEK—Garven & Reynolds' 1, 30-27-27, rigging up. Pebble Beach Oil Co.'s Newhope 6, 29-27-27, td 2653 ft, 60 bbls daily.

SAN EMIDIO—Shell's KCL No. 1-A, 26-11-22, fsh drill pipe 7670 ft.

STRAND—Continental's KCL No. E-1, 17-30-26, lcn.

TEMBLOR HILLS — Chico Martinez Oil Co.'s Exeter No. 1, 1-29-20, 1065 ft, 58 bbls.

WASCO SEMITROPIC—Continental's KCL No. A-2, 8-27-24, dr 13,740 ft. Standard's Randolph No. 2, 14-27-23, prep to swab 9535 ft.

PYRAMID HILLS — Pyramid Prod. Co.'s Retherford No. 1, 27-24-18, dr 2503 ft.

BELLFLOWER—George L. Clayton's Scott 1, 32-3-12, td 6247 ft, co, to deepen.

CASTAIC—Royal Land Corp.'s No. 1, 8-4-17, td 300 ft, sdtr.

MINT CANYON—Mint Canyon Pet. Co.'s Jennings 1, 33-5-14, dr 1862 ft.

PALOS VERDES—Rolling Hills Petroleum Co., Weston 1, 27-4-14, dr 4116 ft.

PICO—A. S. Johnston's 32, 5-2-11, dr 3223 ft.

TOWSLEY CANYON—Towsley Canyon Oil Co.'s Hammon No. 1, 8-3-16, td 4100 ft, pumping water and oil.

WHITTIER—Fullerton Oil Co.'s Whittier No. 5, 25-2-11, lcn.

KRAEMER—Congress Oil Co.'s Kraemer 1, 36-3-9, td 2558 ft, redr.

CHINO—Selegna Drilling & Producing Co.'s Chino No. 1, 12-3-8, abd 3136 ft. Southern Counties Pet. & Drilling Co.'s Los Serranos 1, 22-2-8, rig.

ABBREVIATIONS

The following abbreviations, signs, etc., are used in completions and wildcat reports in THE OIL WEEKLY.

*—*dry hole abandoned well.*
‡—*salt water (completions).*
†—*junked and abandoned.*
¶—*million feet of gas.*
abd—*abandoned.*
bbls—*barrels.*
br—*building rig.*
bs—*basic sediment.*
csg—*casing.*
co—*cleaning out.*
dd—*drilling deeper.*
dk—*derrick.*
dr—*drilling.*
fsg—*fishing.*
ft—*feet*
hfw—*hole full of water.*
in—*inches.*
lcn—*location.*
m—*milling.*
mim—*moving in materials.*
mit—*moving in tools.*
mot—*milling on tools.*
n, s, e, w—*north, south, east, west.*
oih—*oil in hole.*
owdd—*old well drilling deeper.*
owpb—*old well plugging back.*
pb—*plugged back or plugging back.*
r—*reaming.*
rog—*rig on the ground.*
rur—*rigging up rotary tools.*
rust—*rigging up standard tools.*
sd—*shut down.*
sdtr—*sidetracking.*
sg—*show gas.*
si—*shut in.*
so—*show oil.*
so&g—*show oil and gas.*
spd—*spudding.*
sr—*straight reaming.*
sw—*salt water.*
td—*total depth.*
ur—*underreaming.*
wih—*water in the hole.*
wo—*workover.*
wocs—*waiting on cement to set.*
wosr—*waiting on standard rig.*

WYOMING

ALBANY COUNTY — G. R. McConnell's Thomas 1, nw se 6-15n-76w, co 920 ft to complete. Wyco Oil Co.'s Chappell 3, ne ne nw 33-21n-76w, cemented 4¾ in csg, td 2546 ft, woc.

BIG HORN COUNTY—Prescott & Mileski's Government 1, ne nw sw 1-51n-93w, dr 200 ft.

CARBON COUNTY—Italo Petroleum Corporation's Tunney-Bragg 1, ne se nw 11-26n-81w, underreaming 10 in csg, td 1252 ft.

FREMONT COUNTY—Stanolind Oil & Gas Co.'s Johnson 1, cse se 3-33n-96w, dr 7944 ft.

HOT SPRINGS COUNTY — Delaware Oil Co.'s Skelton-Government 1, se se 2-43n-93w, dr 400 ft.

NATRONA COUNTY — General Petroleum Corporation's Government 1, nw nw se 21-35n-77w, running csg.

FLORIDA

NASSAU COUNTY—St. Mary's River Oil Corp.'s Hilliard Turpentine Co. 1, nw ne se 19-4n-24e, elev 110 ft, cemtd off caving hole at 3935 ft, woc.

POLK COUNTY — Edw. A. Hill's Polk County Lbr. Co. 1, nw nw ne 32-25s-25e, dk.

SUWANEE COUNTY—Wm. G. Blanchard's Lucy Cotton 1, se ne 35-3s-11e, elev 70 ft, sd for heavier rig, 200 ft.

ILLINOIS

BOND COUNTY—Universal's Molden 1, nw nw nw 24-6n-4w, sd 2045 ft. Whitehead's Pollan 1, nw se sw 26-6n-2w, co 2633 ft. McBride's Butler 1, nw sw se 30-4n-2w, dr 1246 ft. Rigall's Neillson 1, ne ne nw 32-5n-4w, lcn.

CLAY COUNTY—Shelby O&G Co.'s Nodacker 1, nw se sw 23-3n-7e, td 3110 ft, abd. Milburne's Striegle 1, se nw ne 19-3n-8e, lcn abd. Bonnie Oil's Schnautz 1, se sw ne 31-4n-8e, cor 3036 ft. Wicklund's McCauley 1 "A", ne sw nw 7-2n-9e, der. Campbell's Henderson 1, cn½ ne ne 7-4n-7e, C&P. Carter's Cox 1, ce¼ se sw 14-4n-5e, der. Bonnie Oil's Walker 1, se se nw 21-4n-8e, lcn abd.

CLINTON COUNTY—Dalton's Clifton 1, ne sw sw 15-1n-4w, dr 1525 ft. Ellzy's Williams 1, sw nw sw 1-3n-1w, der. Schlosberg & Siegel's Monken 1, ne sw sw 4-2n-1w, dr 1435 ft. Watkins & Wright's Wise 1, nw nw se 24-1n-3w, mim. Holley & Willis' Hughes 1, cn½ ne nw 18-3n-2w, dr 1315 ft. Noll & Conrey's Barth 1, nw se sw 12-1n-1w, td 1393 ft, testing. Gross' Eversgerd 1, sw nw sw 22-1n-4w, woc 921 ft. Lilly's Siegler 1, nw ne ne se 12-1n-1w, dr 1085 ft. Brookside Oil's Dodillet 1, sw sw nw 21-1n-1w, dr 1240 ft. Thompson-Self's Hanseman 1, se nw ne 12-1n-1w, td 941 ft. Penn-Illinois Oil's Molan 1, sw sw sw 28-2n-1w, brr.

CUMBERLAND COUNTY — Jolly-Hill-Stipes' Jenkins 1, se ne ne 30-10n-9e, td 2130 ft, ur 6-in csg. Kapschuell's Oakley 1, sw ne sw 34-10n-8e, lcn abd. Nat'l Consumers' Vanderhuff 1, nw ne nw 19-9n-9e, mog.

EDWARDS COUNTY — Cotton & Laller's Hays 1, ne ne ne 4-1s-10e, lcn.

EFFINGHAM COUNTY—Kingwood & Carter's Bartel 1, ce½ ne nw 26-6n-5e, td 4102 ft, testing. Kingwood's McWhorter 1, ce½ se nw 15-6n-6e, mirt. Graham-Duncan's Richers 1, cn½ se nw 18-6n-7e, spd 35 ft and sd. Kroger's Shoenhoff 1, se nw sw 5-8n-7e, lcn.

FAYETTE COUNTY—Carter's Miller 1, cw½ nw nw 12-8n-3e, td 3170 ft, cavey hole at 1612 ft. Farrely's Lilly 1, se sw se 16-8n-3e, ur 8-in csg. Wilson & Stokes' Fee 1, nw sw ne 14-8n-3e, lcn. Greer's Metzger 1, cn½ ne nw 19-5n-2e, spd and sd. Ryan & Redgraves' Jones 1, cs½ ne 24-9n-1e, sd.

FRANKLIN COUNTY—Washburn's Neil 1, ce½ se se 6-5s-4e, ur 7-in csg 2419 ft.

HAMILTON COUNTY—Carpenter's Clark 1-A, nw nw sw 32-3s-5e, abd 2160 ft.

JACKSON COUNTY—Stanolind's Leiner 1, se se nw 20-7s-4w, dr 4000 ft.

JEFFERSON COUNTY—Sturbois & Tomberlin's Osborne 1, cnw se 8-2s-2e, dr 2085 ft. Nollen & Benoist's Kelley 1, ne nw ne 25-4s-2e, dr 2565 ft. Dee's Hamilton 1, ne sw nw 20-4s-3e, td 2911 ft. Sturbois & Tomberlin's Morris 1, nw nw sw 6-2s-2e, dr 2450 ft. Myers Bros.' Duckworth 1, ce¼ sw ne 33-4s-4e, rig. Carpenter's Skinner 1, sw nw ne 36-4s-2e, lcn abd. Dee & Foltz' Hamilton 2, sw sw nw 20-4s-3e, rur. Carter's Douthitt 1, ce¼ ne se 9-1s-2e, td 1962 ft, bad cem job.

MARION COUNTY—Siegel & Schlosberg's Roddy 1, sw se sw 20-2n-3e, sd 2182 ft. Marion Oil's Wilson 1, ne ne se 18-3n-3e, sd 1475 ft. Hackman & Harris' Britt 1, nw nw nw 36-4n-1e, sd 1050 ft. Mahutske Oil's Nichols 1, se sw se 12-4n-4e, td 2885 ft, to pb. McBride's Clow 1, sw sw se 29-2n-1e, dr 1985 ft. Dalton's Ira Dalton 1, nw se ne 19-1n-3e, spd. Oil Royalties' Suggs 1, csw nw nw 11-2n-1e, mach on ground. Coyer's Mulvaney 1, se ne se 6-2n-4e, der. Shedden's Rawlica 1, sw ne sw 33-2n-1e,

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B-M-W products at supply stores, including: ● The above described Balls and Seats; ● ADMORE Insert Pump Anchors; ● NEILSON Tools (Safety Sucker Rod Hooks, Tubing Hooks, Rod Elevators, Sucker Rod Sockets, etc.); ● ADMORE Liner Barrels; ● TEX TYPE Plunger Fittings and Valves; and ● COLLINS Belt Clamps.

BRADFORD MOTOR WORKS INC.
OIL WELL SUPPLIES
BRADFORD, PA. — TULSA, OKLA.

mirt. Thompson's Baker 1, sw nw sw 9-1n-1e, mirt.

MASSAC COUNTY—Kahle's Harvick 1, sw sw sw 23-14s-3e, dr 2867 ft.

MONTGOMERY COUNTY—Cassidy's Nieman 1, cse sw 29-8n-5w, pb to 717 ft, abd. Myers' Klekamp 1, sw sw se 29-8n-5w, mach.

POPE COUNTY—Whitlock's Anthis 1, nw nw ne 12-11s-5e, dr 1374 ft.

RANDOLPH COUNTY—Delaney & Mabee's Wilson 1, ce¼ se ne 3-4s-5w, dr 3475 ft. Pioneer O&G Co.'s Johnie 1, se nw nw 28-6s-6w, sd 567 ft. Bremen's Wilson 1, se se se 22-6s-6w, spd and sd.

RICHLAND COUNTY — Mammoth's McCauley 1, sw se nw 28-3n-9e, co 3146 ft. Ray & Alford's Franklin 1, nw nw ne 34-5n-10e, der. Parker's Berry 1, se sw ne 22-2n-14w, spd and sd. Miller & Ake's Schlichenmeyer 1, cne sw se 16-3n-10e, spd and sd. American Exploration's Johnson 1, cnw ne nw 29-4n-9e, rot der. Gulf's Hill 1, cn¼ sw nw 2-4n-10e, cor 2990 ft. American Nat'l Drlg.'s Everson 1, ne ne se 23-3n-9e, dr 1395 ft.

SALINE COUNTY—Rogers' Daylor 1, se se se 3-10s-6e, td 1125 ft. Bolton's Beagle 1, nw nw nw 13-9s-7e, td 1871 ft, co to btm, 100 ft oih, 48 hrs.

SCOTT COUNTY—Gregory & Mechling's Foltz 1, nw sw ne 31-14n-14w, sd 1196 ft.

SHELBY COUNTY—Breazeale's Richardson 1, cnw nw 35-12n-14w, sd 198 ft. Farrior's Smith 1, ne ne ne 1-12n-2e, lcn.

WABASH COUNTY—Martin's Wood 1, ne se nw 31-1n-12w, dr 2248 ft.

WARDS COUNTY—Schmidt's Strenne 1, ne nw ne 5-1n-14w, spd and sd. Leach Bros.' Lee 1, sw ne se 11-1s-10e, sd 3090 ft. Cotton's Leibke 1, ne ne sw 20-1n-14w, C&P.

WASHINGTON COUNTY — Bitterman's Jesse 1, cse ne 16-3s-2w, td 675 ft, pb 75 ft. Frost & Vicker's Frank 1, sw nw nw 28-1s-4w, sdo 937 ft.

WAYNE COUNTY—Torpon Pet.'s Bright 1, ne ne ne 21-1n-5e, cor 2998 ft.

WHITE COUNTY—Heldt's Dagley 1, sw ne sw 12-7s-9e, C&P. Hunt's Smith 1, 11-5s-8e, der.

KANSAS

BARBER COUNTY—Palmer's Warwick 1, cnw 29-31s-10w, sd 4000 ft. Carter & Wentz' Lytle 1, cne nw 6-32s-14w, td 3325 ft.

BARTON COUNTY—Price' Hammeke 1, ne ne sw 12-18s-12w, pb to 3429 ft, testing. Martin & Foraker's Dick 1, ne sw sw 31-19s-11w, mim and sd. Shell's Ehrlich 1, sw sw sw 1-16s-14w, dd to 3296 ft, 2800 ft oih. Day's Feltes 1, se se ne 14-16s-12w, sd 1875 ft. Sinclair Prairie's Oeser 1, ne ne se 17-16s-11w, abd 3122 ft. The Texas Co.'s Lowry 1, cnl nw sw 2-17s-13w, dr 3353 ft. Murfin's Rexroot 1, nw nw se 14-17s-13w, rig. Crown Pet.'s Schartz 1, sw se nw 7-20s-11w, dr 1100 ft. Price's Wondra 1, nw nw ne 10-17s-13w, ru. Sinclair Prairie's Frederick 1, sw sw se 16-16s-11w, dr 1808 ft. Silverstein & George's Otte 1, se se nw 2-19s-14w, mim.

BUTLER COUNTY—Steinbuchel's Fox 1, nw se ne 25-26s-3e, sd 1010 ft. Dustin's Miley 1, se nw ne 12-27s-5e, sd 810 ft. Saco, Kansas & Gulf's Pettit 1, sw nw sw 21-28s-6e, sd 275 ft.

CHASE COUNTY—Duffy's Leedy 1, ne nw nw 26-22s-9e, dr 1470 ft.

CHAUTAUQUA COUNTY—Sooby's Davis 1, sw ne nw 29-33s-10e, sd 1504 ft.

CLARK COUNTY—Olson Oil's Lehman 1, se se sw 2-32s-21w, td 6807 ft, abd. Olson Oil's Watkins 1, sw sw nw 23-32s-21w, pb to 6810 ft, dr cem.

COWLEY COUNTY—Trees & Talbott's McMinn 1, ne ne nw 16-31s-6e, td 2995 ft, abd. Brewer's McDaniels 1, sw sw sw 24-30s-4e, br. Palmer's Neimiller 1, ne ne ne 14-30s-4e, dr 2255 ft. Brewer's Clark 1, ne se nw 6-31s-4e, woc 2860 ft. Wakefield's White 1, nw nw ne 4-33s-4e, sd 1500 ft. Milton's Milton 1, sw sw se 16-34s-5e, ponds. Bess & Gralapp's Hunt 1, cnl ne nw 18-34s-5e, lcn.

EDWARDS COUNTY—Douglas & Gears' Meade 1, se se nw 35-25s-16w, sdo.

ELLIS COUNTY—Skiles' Jensen 1, sw se ne 26-12s-18w, sd 2910 ft. Duwe & Farris' Hadley 1, se ne se 12-11s-18w, recem csg, woc. Bradley's Jensen 1, nw nw se 36-11s-19w, show sulphur wtr. Continental's Baumrucker 1, ne ne sw 25-14s-16w, dr 3030 ft. Helmerich & Payne's Stebbins 1, nw nw se 7-13s-20w, dr 3598 ft. Muth's Penney 1, cnl ne se 29-14s-18w, td 350 ft, abd. Witt & Sheridan's Hall 1, nw sw ne 1-12s-17w, rur. Hays & Sackrider's Windholtz 1, ne ne ne 2-13s-16w, td 3150 ft, 700 ft oih, 10 hrs. Central Pet.'s Foster 1, csl se nw 33-11s-16w, dr 3042 ft. Western Kansas' Cole 1, ne se se 24-11s-20w, lcn. Carter's Foster 1, se se nw 1-15s-16w, rur.

ELLSWORTH COUNTY—Colonial's Hogy 1, nw nw sw 16-16s-10w, td 3342 ft, 3150 oih 8 hrs. Wixon's Peterman 1, sw sw sw 28-17s-10w, td 3306 ft, 100 ft oih 2½ hrs, est. ½ bbls wtr per hr.

FINNEY COUNTY—Atlantic's Nunn 1, se se ne 27-21s-34w, rur.

GRAHAM COUNTY—Continental & Cities Service' Morel 1, cw½ e½ ne 15-9s-21w, brr.

GRAY COUNTY — Reynolds' Watkins 1, csw 32-28s-28w, rot rig.

GREENWOOD COUNTY — Whittaker & Johnson's Cannon 1, cel se nw 8-26s-13e, td 1504 ft, rung 5-in csg. Nichols' Central Life Ins. Co. 1, sw sw se 35-25s-12e, spd and sd. Whittaker's Bressner 1, nw nw se 8-26s-13e, dr 300 ft.

HARPER COUNTY—Franklin Drlg.'s Waltz 1, ne ne sw 24-34s-6w, sd 4185 ft.

HARVEY COUNTY—Nat'l Ref. Co.'s Brown 1, nw se ne 22-23s-2w, td 3515 ft, abd.

JACKSON COUNTY—Lemmick Oil's Marble Savings Bank 1, cne ne 26-9s-14e, sd 510 ft.

JEWELL COUNTY — Hollingsworth Bros.' Wolfe 1, nw sw se 14-4s-8w, sd 100 ft.

LANE COUNTY—Phillips Pet.'s Kees 1, cse se 3-19s-30w, sd 4885 ft.

McPHERSON COUNTY—Pulse's Boesker 1, se se nw 29-20s-1w, rig. Phillips Pet.'s Galle 1, nw nw ne 11-21s-2w, dr 3275 ft. Archer & Crane's Templin 1, nw sw se 32-17s-3w, co 3201 ft. Darrah-Aurell's Decker 1, sw sw se 12-21s-2w, dr 2875 ft.

MEADE COUNTY—Pacific Mid-West's Rexford 1, ne se sw 8-30s-29w, sd 200 ft. Barnett's Adams 1, sw sw ne 22-34s-30w, ru.

NESS COUNTY—Jones & Lane's Page Milling Co. 1, se se nw 36-18s-26w, co 3265 ft. Marshall's Anderson 1, sw sw nw 23-16s-24w, sp and sd. Trojan's Moses 1, csw nw 10-18s-25w, sd 500 ft.

OTTAWA COUNTY — Babcock's Copeman 1, cnw ne 18-10s-2w, pits.

PHILLIPS COUNTY—Davidson's Elliff 1, se ne ne 35-5s-18w, sd 600 ft.

PRATT COUNTY—Cities Service & Atlantic's Delaney 1, csl ne 13-26s-12w, dr 2820 ft.

RENO COUNTY—Schneider's Kroecker 1, ne ne ne 12-22s-5w, dr 3977 ft. Carey's McPheeters 1, ne ne nw 22-26s-8w, dr 3637 ft. McCole's Mathews 1, sw nw nw 15-24s-10w, dr 2340 ft. Cities Service's Kreie 1, cnw 27-23s-10w, dr 3390 ft. Amerada & Westgate-Greenland's Johns 1, se se se 25-22s-5w, mim.

RICE COUNTY—Price' Gemeinhardt 1, ne ne se 18-18s-10w, td 3297 ft, testing. Schneider's Sterling College 1, se sw se 28-20s-8w, dr 3120 ft. Cities Service's Habiger 1, sw sw nw 18-18s-9w, dr 2872 ft.

ROOKS COUNTY—Producer's Ham 1, sw sw nw 25-7s-19w, sd 330 ft. Graham's Fike 1, sw sw sw 9-9s-17w, sd 3370 ft. Witt & Sheridan's Morrison 1, nw se sw 29-10s-17w, rot rig. Elwell's Zimmerman 1, ne ne nw 15-9s-18w, dr 3350 ft. Duwe & Farris' Hancock 1, nw sw sw 21-10s-18w, dr 3390 ft.

RUSSELL COUNTY—Emrich's Anderson 1, ne se sw 33-15s-11w, spd and sd. Parks' Gorham Est. 1, sw nw ne 19-15s-15w, dr 650 ft. Jones' Kuhnle 1, se se nw 4-15s-12w, dr 1395 ft. Hess' Reinhardt 1, ne ne sw 36-12s-14w, dr 2950 ft. Smith & Unruh's Stielow 1, nw nw nw 32-11s-14w, dr 1500 ft. Atlantic's Boxberger 1, ne se nw 10-15s-14w, sd 150 ft.

SEDGWICK COUNTY — Talbott's Downs Est. 1, se se nw 32-28s-2e, testing. Union O&R's Howell 1, sw sw sw 6-29s-1e, fsg 2410 ft. Hudson's Fulton 1, ne ne se 35-28s-1e, fsg 1550 ft. McKnabb's Garrett 1, se sw sw 18-29s-1e, dr 2477 ft. Steinbuchel's McAdams 1, sw sw ne 28-29s-1e, td 3790 ft, abd.

STAFFORD COUNTY—Hipple's Moses 1, nw nw sw 9-22s-13w, pb to 3635 ft, abd. Terry & Feaster's Negley 1, sw sw ne 23-22s-12w, sd 3743 ft. Lindsay & Bailiere's Tieperman 1, sw sw nw 32-22s-12w, dr 3663 ft. Cardinal & Carraker's Sittner 1, sw sw sw 4-22s-12w, td 3700 ft, swabbing. Carter's Andress 1, cnl se 2-21s-13w, td 3608 ft, abd. Knight's McNickle 1, se se ne 2-24s-11w, cel. Nat'l Ref. Co.'s Bonham 1, sw sw se 28-25s-12w, cor 3585 ft. Stanolind's Hill 1, ne ne sw 2-23s-12w, cor 3743 ft. Stanolind's Hahn 1, ne ne nw 14-22s-13w, so 3495-98 ft. Hamilton's Hitz 1, ne ne nw 23-22s-13w, td 3851 ft, abd. Rust's Krakenberg 1, sw sw sw 20-22s-12w, mim. Continental's Fair 1, cnl sw 12-25s-13w, lcn. Pryor & Lockhart's DeSalms 1, ne ne ne 3-25s-11w, lcn.

SUMNER COUNTY—Saco's Phipps 1, sw se ne 24-30s-1w, spd and sd. Jones' Stunkel 1, se se sw 2-30s-1w, rig. Shawver's Stewart 1, nw nw se 4-32s-3w, circ 4380 ft. Colonial's Miles 1, se ne ne 30-30s-4w, mim.

TREGO COUNTY—Carlock's Kinzel 1, sw sw sw 9-13s-22w, spd and sd. Manning & Martin's Lynd 1, nw nw sw 16-11s-21w, run 10-in csg 1680 ft.

WOODSON COUNTY—Reeser's Weide 1, nw nw se 18-25s-14e, sd 1150 ft. London & Mendenhall's Slough 1, ne ne sw 9-24s-13e, dr 1675 ft.

NORTH LOUISIANA

BIENVILLE PARISH—Gulf's Goodpine Oil Co. 1, se sw 25-14n-8w, elev 157 ft, massive anhydrite 5303-5420 ft, dr 8628 ft gray sand, streaks black shale. DeSoto O&G Co.'s Wm. Ashley 2, c sw se 15-16n-10w, lcn abn; Wm. Ashley 3, c nw se 15-16n-10w, rog. Hunt-Seaboard's Hodge-Hunt 1, se nw 36-17n-6w, rog.

CADDO PARISH—Olsen Drlg. Co. et al's Sharpe 1, c nw ne 10-18n-16w, dr 5565 ft shale and lime. A. D. Robinson et al's Dickson 1, 22-20n-14w, 5-3/16 in csg 2400 ft, cemtd short string 4-in csg after running electrical tester, arr perf in Nacatosh, td 2805 ft.

CATAHOULA PARISH—G. E. Foster et al's W. S. Peck 1, c s½ 39-10n-8e, 16-in csg 20 ft.

CLAIBORNE PARISH—Union Prod. Co. et al's Brownfield 2, c se nw 5-19n-5w, elev 235 ft, pb to 8850 ft, sdtr 8633 ft, old td 9964 ft; Kilpatrick A-1, 11-19n-6w, tested sw in Travis Peak, 5915-71 ft, sw abn, td 6077 ft.

CONCORDIA PARISH—Edw. A. Addey et al's Pasternach 1, c nw sw 49-8n-9e, woc 480 ft.

DE SOTO PARISH—Clear Lake Oil Co.'s Woolums 1, nw nw 29-12n-12w, cored sand so, sd for csg, td 2694 ft. La. Seaboard's Lawrence 1, sw ne 36-12n-14w, spd. S. S. Alexander's Stell 1, 5-12n-16w, owdd, td 6002 ft.

FRANKLIN PARISH—Southern Star Pet. Co.'s Grayson 2, sw ne 36-12n-6e, sd 1755 ft.

LINCOLN PARISH—E. T. Oakes, H. D. Easton et al's N. L. Griggs 1, c sw 36-18n-1w, elev 199 ft, shot formation second time at 5932-41 ft, swabbing, td 6260 ft.

MADISON PARISH—Continental Oil Co.'s Singer Mfg. Co. 1, c ne ne 3-15n-11e, mim.

MOREHOUSE PARISH—W. J. Furlong, Jr. et al's E. M. Clark 1, 10-20n-7e, elev 103 ft, top Permian lime 6218 ft, running electrical tester, td 6515 ft (contract depth).

NATCHITOCHES PARISH—Joe E. Popkins' Peavy-Wilson 1, nwc 36-7n-9w, rur.

RED RIVER PARISH—Glassell & Whitehurst's LeLong 1, ne nw ne 25-12n-11w, washing to bottom, td 1810 ft.

SABINE PARISH—J. C. Sutton Oil Co.'s Sabine Lbr. Co. 1, se nw ne 23-7n-14w, 9⅝ in csg 2132 ft, cored sand so 3580 ft, ran formation tester, so, sg and show sw, cored sandy lime so 3841-53 ft, ran formation tester, showed 1200 ft oil in 9 minutes, arr set 7-in csg, td 3853 ft (Washita).

TENSAS PARISH — H. B. Schumacher's Mounds Land Co. 4, 39-11n-12e, lcn.

UNION PARISH—Joe Modisett et al's Frost 1, ne sw 14-21n-1e, elev 188 ft, top Travis Peak 4050 ft, top lower Marine 6161 ft, dr 7335 ft.

WEBSTER PARISH — Magnolia's Frank Sexton 1, c sw ne 32-23n-9w, elev 225 ft, 13⅜ in csg 838 ft, top first anhydrite stringer 4175 ft, top massive anhydrite 4348 ft, top Travis Peak 5701 ft, 9⅝ in csg 6838 ft, dr 7685 ft. Lunsford & Ferguson's Turner 1, 20-20n-8w, temp abn, td 2309 ft. Fohs Oil Co.'s Thomas 1, se se 10-22n-11w, rur.

WINN PARISH—G. W. Zeigen's La. Cent. Lbr. Co. 13, 4-13n-1e, woc surf cas 63 ft.

SOUTH LOUISIANA

ACADIA PARISH—Humble's Boyd Finch 1, South Crowley prospect, 22-10s-1e, dr shale 8394 ft.

ALLEN PARISH—Humble's Bel 3, Bel prospect. 28-6s-7w, fsh 2732 ft.

CALCASIEU PARISH — Shell's Calcasieu National Bank 1, Hayes area, 18-11s-5w, dr shale 8767 ft. Sun's Lutcher Moore 1, Northwest Starks prospect, 1-8s-13w, ru.

CAMERON PARISH — Humble's Miami Corp. 1-B, Little Cheniere area, 7-14s-6w, setting csg 7230 ft. Superior's State 1, in Gulf of Mexico, 15s-8w, fsh 9394 ft.

EAST BATON ROUGE PARISH—Austin B. Taylor's Duplantier 1, University Block prospect, 65-7s-1w, woc 2084 ft. Cavalier Oil Co.'s Elliott 1, n of Hope Villa, 3-8s-2e, washing to bottom 7681 ft.

IBERIA PARISH—Texas Co.'s State 4, Fausse Point area, 35-11s-8e, coring shale 8131 ft; same operator's Bayless & Jones 1, e flank of Jefferson Island, 58-12s-5e, dr shale 2423 ft; same operator's State 2-B, in Vermilion Bay, 16s-5e, coring salt 7142 ft.

JEFFERSON DAVIS PARISH—Stanolind's W. B. Conover 1, South Welsh prospect, 20-9s-5w, coring shale 5515 ft. Union Sulphur's Calcasieu National Bank 1, Woodlawn area, 12-9s-6w, coring shale 6010 ft.

LAFAYETTE PARISH—Continental's Foreman 1, South Scott area, 36-9s-3e, coring shale 7620 ft.

ST. BERNARD PARISH—Gulf's State RR 3, Lake Borgne area, 6-12s-15e, ru.

ST. LANDRY PARISH—Noxon & Toomb's Boagni 1, Opelousas area, 41-6s-4e, ru.

ST. MARTIN PARISH—Carter, Stewart et al's Martin 2, Section 28, 32-9s-7e, coring soft sand 4400 ft. Shell-Tide Water's Unit 1, West Lake Verrett area, 11-14s-12e, coring shale 8912 ft. Texas Co.'s St. Martin Land 11, Henderson area, 21-8s-7e, lcn; same operator's State 4, Lake Mongoulois area, 14-10s-9e, coring shale 7851 ft.

ST. MARY PARISH—Petroleum Heat & Power Co.'s Parro 1, nw of Charenton, 9-13s-9e, sd 3009 ft.

TERREBONNE PARISH—Fohs Oil Co.'s Buckley 1, Dulac area, 77-19s-17e, coring shale 7265 ft; same operator's State 1, La Terre area, 41-19s-19e, dr shale 7019 ft.

MICHIGAN

ALLEGAN COUNTY—R. C. Lentz's Allek 1, 334n-12w, dr 1450 ft. S. B. Hood's Wright 1, 9-3n-13w, 5 in csg 1610 ft. Vague & Nilsen's Vedetta 1, 25-2n-14w, sd 1550 ft.

BAY COUNTY—C. W. Teater's Goodman 1, 28-18n-3e, dr 2810 ft. Gulf Ref. Co.'s Swantek 1, nw se se 35-15n-4e, mim.

CALHOUN COUNTY—Mar-Cal's Wood 1, 13-2s-6w, rig. Verona Crude Oil Co.'s Fruin 1, 29-1s-7w, dr 90 ft.

CLARE COUNTY — Big Basin Oil Co.'s Murphey 1, 26-17n-3w, r 8-in csg, td 1104 ft. Gulf Ref. Co.'s State Bank A-1, 36-17n-4w, mim.

GLADWIN COUNTY—W. E. Ross, Trustee's Kinyon 1, 18-18n-2e, drilling out plug 3140 ft. McClanahan Oil Co.'s Sharp 1, sw sw sw 9-19n-2w, dr 430 ft. Franklin Pet. Co.'s State 1, 8-19n-2e, dr 2600 ft.

ISABELLA COUNTY—Bell & Mark's Fox 1, 5-13n-5w, dr 710 ft. J. V. Wicklund Dev. Co.'s Lawens 4, 24-15n-5w, dr 1700 ft. J. G. Zabel's Kennedy 1, 25-14n-4w, dr 2990 ft.

MECOSTA COUNTY — Mitchell Oil Co.'s Blodgett 1, c se se 22-13n-10w, cleaning out, td 1235 ft. Jetter Drilling Co.'s Deakins 1, 28-13n-7w, dr 680 ft.

MIDLAND COUNTY—Sun's State 1-B, 5-16n-1w, testing sw, td 3860 ft; State C-1, 3-15n-1w, dr 300 ft. Wicklund Dev. Co.'s Land Co. 3, 24-16n-2w, dr 1190 ft.

MONTCALM COUNTY—Smith Pet. Co.'s Williams 1, 17-11n-7w, dr 2800 ft. Socony-Vacuum Oil Co.'s Hansen 1, 22-12n-6w, dr 2867 ft. H. L. Gentry's Christensen 1, 29-11n-8w, 6 in csg 1355 ft.

NEWAYGO COUNTY—Gulf's Walker 1, 25-13n-13w, rig.

SAGINAW COUNTY—Roy Hogan, Inc.'s Price 1, 2-11n-1e, dr 2690 ft.

MISSISSIPPI

CALHOUN COUNTY—S. and O. Properties, Inc.'s G. C. Cooner 1, se ne 12-24n-8e, dr 2240 ft.

CLAIBORNE COUNTY—Claiborne County Dev. Co.'s Ruth Hayden 1, s½ se 55-11n-2e, elev 199 ft, arr deepen, td 1455 ft.

GEORGE COUNTY—Cleve Love et al's J. J. Newman Lbr. Co. 2, c sw 9-1s-8w, elev 111 ft, dr 650 ft.

HINDS COUNTY—Cleve Love et al's Montgomery 1, sw se se 28-6n-4w, lcn. S. F. Johnson 1, ne se 29-6n-1w, dr 1503 ft sticky gumbo. Black River Oil Co.'s Federal Land Bank 1, ne ne 11-15n-5e, elev 146 ft, top chalk 6961 ft, dr 7458 ft.

LAMAR COUNTY — Southern Miss. Pet. Corp.'s Morris 1, nw se 4-2n-14w, sd for csg 1162 ft.

SIMPSON COUNTY—Goodwill O&G Co.'s Berry 1, se sw 33-2n-4e, fsg drill pipe 1710 ft.

YALABOUSHA COUNTY—Acme Holding Co.'s S. D. Boyle 1, nw nw 33-25s-7e, elev 415 ft (corrected), sd 810 ft, Midway.

OKLAHOMA

ADAIR COUNTY—Maddox' Penn Mutual Life Ins. Co. 1, cs½ ne nw 5-16n-24e, sd 520 ft.

ATOKA COUNTY — Sheldon & Gardner Pet.'s Lee 1, ne nw sw 2-4s-10e, sd 2416 ft. Stanolind & Amerada's Ridgway 1, nw ne ne 24-3s-9e, dr 2375 ft.

BECKHAM COUNTY — Mid-American's Biscoe 1-A, sw sw sw 28-8n-22w, dr 2669 ft.

BRYAN COUNTY — Southern's Henry 1, cnw ne 10-8s-7e, dr 4120 ft.

CADDO COUNTY—I. T. I. O. Co.'s Dome-Bo 1, cne se 29-6n-10w, td 6900 ft, abd.

CARTER COUNTY—Lloyd & Noble's Revelle 1, sw sw se 21-3s-2w, td 4028 ft, sdo.

CLEVELAND COUNTY—Harper & Turner's Pollock 1, cw½ nw nw 13-9n-2w, dr 7293 ft. Hollenbeck's Mantooth 1, nw nw nw 24-6n-1e, rig. Delaney's Bugher 1, se se sw 12-7n-2w, wo tools.

CHOCTAW COUNTY—Chapman & Lowe's Hallum 1, nw nw ne 4-7s-20e, sd 675 ft. Ross' Hardy 1, se se nw 21-7s-15e, lcn.

COMANCHE COUNTY—Wolf's Costinus 1, sw sw se 30-4n-11w, spd.

COTTON COUNTY—W & P Oil's Worsham 1, nw nw se 15-4s-10w, lcn.

CREEK COUNTY—Mosier's Holcomb 1, se sw ne 19-18n-1e, td 3018 ft, 2000 ft wih and sso, sd.

GARFIELD COUNTY—Hollenback's Clark 1-A, nw nw nw 34-21n-6w, td 7336 ft, to perf.

GARVIN COUNTY—Edwards' Clark 1, ne ne ne 16-3n-3e, pb to 2090 ft, rust.

GRADY COUNTY—Gulf's Thomas 1, sw nw nw 14-4n-5w, dr 10,772 ft. Doyle's Huffine 1, nw nw se 30-5n-8w, der. Nicholson's Cleveland 1, nw ne ne 18-5n-8w, pits.

GREER COUNTY—Medlin's Broudie 1, nw nw nw 5-6n-20w, sd 90 ft. McDonald's Fite 1, se se nw 34-7n-21w, ur 6-in csg 969 ft. Gauntt & Baker's Parks 1, nw nw sw 29-7n-20w, sd 720 ft. Everitt's Graumann 1, ne nw nw 11-5n-21w, c&p.

HUGHES COUNTY—Phillips Jet.'s Becker 1, ne nw sw 8-5n-10e, pb to 5760 ft, woc. Doup's Bank 1, ne ne nw 7-7n-9e, sd 335 ft. Rives' Hawthorne 1, sw sw se 19-7n-10e, lcn. Phillaine's Morrison 1, se se sw 13-9n-10e, mi mach. Amerada & Stanolind's Preame 1, nw nw se 29-9n-9e, dr 2940 ft. Moore's Hunter 1, ne ne nw 30-4n-9e, dr 220 ft. Marbett Oil's Breeding 1, ne sw ne 12-7n-8e, td 1097 ft, to shoot. Amerada & Stanolind's Martin 1, nw ne ne 6-9n-9e, br.

JEFFERSON COUNTY—Massad & Swainsberger's Barrett 1, ne se se 14-6s-6w, sd 1890 ft. Weir's Hayes 1, se se nw 23-7s-7w, der.

JOHNSTON COUNTY—Patton's McCrummens 1, sw sw ne 16-1s-6e, sd 1380 ft. Shelton's Chapman 1, cnw nw 26-4s-6e, fsg 3176 ft.

KAY COUNTY—Shaffer's McKee 1, ne ne nw 20-28n-1w, sd 2500 ft. Shaffer's Rudolph 1, ne ne sw 27-29n-1w, cel. Nye's Willins 1, se se sw 24-27n-4e, c&p.

KIOWA COUNTY—Hughes & Reese' Fultz 1, se se se 10-6n-18w, sd 1238 ft.

LINCOLN COUNTY—Wilcox' Royer 1, se se ne 18-14n-6e, dr 1800 ft. Stanolind & Amerada's Strader 1, nw nw ne 8-13n-3e, dr 4250 ft.

LOGAN COUNTY—The Texas Co.'s Roper 1, cw½ sw se 22-15n-1e, td 5542 ft, sdo. Arrow Drlg.'s Dodson 1, nw nw nw 23-17n-1w, woc 5234 ft. Carter's Lydick 1, ce¼ nw ne 23-15n-4w, rur.

LOVE COUNTY — Sinclair Prairie's Peabody Seating Co. 1, ne ne ne 35-6s-2w, dr 1331 ft.

MURRAY COUNTY—Owens' Gryer 1, ne se ne 34-1s-3e, dr 2685 ft.

MUSKOGEE COUNTY—Cusack's Elliott 1, cnl nw sw 20-15n-20e, rog. Cusack's Fee 1, ne sw se 20-15n-20e, spd 65 ft. Heydrick's Bolby 1, cne 22-13n-19e, sd 496 ft.

OKFUSKEE COUNTY — Broswood Oil's Lehman 1, nw sw nw 21-13n-10e, td 2854 ft, pop.

OKLAHOMA COUNTY—Allen's Weaver 1, ce½ se nw 6-14n-3w, dr 6245 ft.

OKMULGEE COUNTY—Detrick's McCann 1, nw se sw 33-14n-11e, dr 1600 ft. Bryan Pet.'s Thompson 1, cse ne ne 8-15n-11e, rig.

OSAGE COUNTY—Norbla-Carter's Mullendore Trust Co. 1, nw nw nw 3-24n-6e, spd. Norbla's Osage 1, se se se 18-25n-7e, lcn.

PAWNEE COUNTY — Ross & Patterson's Morhain Heirs 1, ne ne nw 30-22n-7e, rig.

PAYNE COUNTY—Big Chief Drlg.'s Moore 1, se sw nw 17-18n-1e, rig. Helmerich & Payne's Ritchie 1, cne nw 34-18n-1e, dr 3865 ft.

PONTOTOC COUNTY—Union Dev. Co.'s Abbott 1, sw nw ne 34-3n-6e, fsg 3320 ft. Lee's Weatherly 1, nw se nw 24-1n-7e, dr 280 ft. Cowley's McCormich 1, sw sw se 29-2n-4e, sd at 222 ft. Delaney's Perrine 1, se nw nw 27-5n-5e, lcn.

POTTAWATOMIE COUNTY — Hall & O'Mara's Shaw 1, ne ne se 32-6n-5e, td 2640 ft. Davis' Jones 1, nw ne sw 34-6n-5e, td 2314 ft.

SEMINOLE COUNTY—Woodson & Marydun Oil's Gilliland 1, se se sw 24-11n-7e, fsg 4295 ft. Pine's Wright 1-A, se se ne 16-6n-6e, rig. Myers & Holko's Berrio 1, se se nw 15-10n-6e, dr 480 ft.

STEPHENS COUNTY—Coline's Johnson 1, sw se ne 1-2n-8w, td 9086 ft, bailing and co. Helmerich & Payne's Pfile 1, sw sw sw 1-2s-7w, pb to 4020 ft, tools out. Parsons' Moursberger 1, cs¼ sw se 29-2n-8w, spd.

TEXAS COUNTY—Hagey's Peck 1, cne¼ 6-1n-13ecm, td 2842 ft, co. Hardendorf & Kuhn's Wiggin 1, cnw¼ 1-2n-14ecm, dr 2490 ft. Hardendorf & Kuhn's Wiggin 2, cne¼ 2-2n-14ecm, lcn.

TILLMAN COUNTY—Cockburn's Nicholas 1, se se se 28-2n-19w, sd 3325 ft. Gibson-Jennings' Burleson 1, se se sw 35-2s-19w, der. Schoonover's Loftis 1, nw nw se 19-2s-18w, lcn. Martin's Parris 1, nw nw sw 3-3s-19w, dr 1965 ft. Grimes' Laney 1, nw nw nw 3-3s-18w, sd 3490 ft. Grimes' Hall 1, sw ne sw 12-3s-19w, lcn.

EAST TEXAS

BOWIE COUNTY—King Oil Corp.'s W. W. Ames 1, J. A. Talbott sur, 4½ mi nw Texarkana, elev 362 ft, base anhydrite 3990 ft, dry and abd 4480 ft; Nanny Watts 1 (12-ac), G. Brinbee sur, 4 mi w Texarkana, elev 374 ft, dr 2010 ft.

CHEROKEE COUNTY—Bunn Drl. Co.-John G. Mayo et al's J. H. Bowling 1, W. H. Walters sur, 2 mi se Lone Star, fsh 3785 ft. Lide, Greer and American Liberty Oil Co.'s S. L. Tankersley 1 (40-ac), Jose Pineda sur, Ironton, base Pecan chalk 4090 ft, dr 4450 ft. Merica Oil Co.-W. L. Stone's Cherokee Dev. Co. 1, A. J. Acker sur, 2 mi e Maydelle, elev 661 ft, Pecan chalk 4087-4454 ft, Austin chalk 5000-5232 ft, top Woodbine series 5260 ft, water sand 5303-33 ft, dry and abd.

DALLAS COUNTY—Mauldin Oil Co.'s W. E. Howell 1 (107-ac), S. Layton sur, 8 mi e Grapevine, dr 1010 ft. Plaza Oil Co.-W. A.

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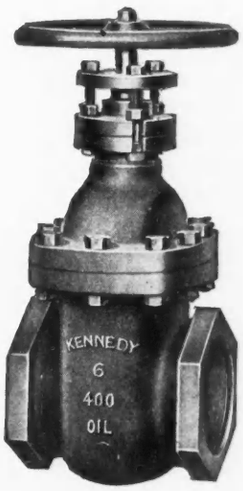

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COMPREHENSIVE INDEX

of the

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By

DAISY WINIFRED HEATH

A.A.P.G. PUBLICATIONS INDEXED
(20 Years of Geology of Oil and Gas)

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THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS
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Tulsa, Oklahoma, U.S.A.

Brooks, Jr.'s B. J. Davidson 1 (75-ac), John D. Merchant sur, dr 1735 ft.

DELTA COUNTY—O. W. Killam et al's Delta Farming Assn. 1, J. Dollahite sur, 4 mi ne Sulphur Bluff, elev 348 ft, top Woodbine 2712 ft, sd 2920 ft.

FRANKLIN COUNTY—Ajo Oil Corp. et al (was Chenault's) T. J. Sanders 1 (4-ac), C. Payne sur, Talco sub-Trinity test, elev 365 ft, Pecan chalk 1602-1920 ft, top Woodbine red beds 3635 ft, top Georgetown lime 4012 ft, cut fault 4575 ft, first anhydrite 5143 ft, dst at 5388-5417 ft, filled 85 ft mud and 5 ft of 26.7 gravity oil, coring 5460 ft. L. S. Harper et al's Fee 2, W. N. Dawson sur, 7½ mi nw Mt. Vernon, elev 377 ft, mim.

GREGG COUNTY—Humble & Gulf's E. D. Robertson 1 (11.4-ac), M. Mann sur, 2½ mi w by s Longview, 4 mi e production, elev 272 ft, Austin chalk 3202-3341 ft, top Georgetown 3341 ft, top Paluxy 4541 ft, first Glen Rose 4876 ft, top anhydrite stringer 5617 ft, massive anhydrite 6214-6532 ft, top Travis Peak 7325 ft, dr hard sandstone 8840 ft.

HENDERSON COUNTY—E. B. LaRue et al's Breedlove-Mills 1 (232½-ac), J. Dunn sur, 5 mi nw LaRue, elev 485 ft, Pecan chalk 1906-1970 ft, Austin chalk 2635-2960 ft, top Woodbine 3004 ft, sd 3102 ft. Jones & Mallory's R. Mallory 1, T. S. Mitchell sur, 6 mi sw Mabank, rur. DeArman, McMillan & Hunt's J. M. Dawdy 1, Geo. Hancock sur No. 7, Flag Lake area, Pecan chalk 130-1830 ft, Austin chalk 2515-2947 ft, Woodbine 3100-05 ft, dry and abd. Harry Hines, Hancock et al's A. R. Dillard 1, Henry Jeffrey sur, Flag Lake area, elev 352 ft, Pecan chalk 1765-1900 ft, Austin chalk 2509-2781 ft, top Woodbine 3070-76 ft, flowed 417 bbls oil 3¾ hrs, partly choked.

HOUSTON COUNTY—Humble O&R Co.-Sun Oil Co.'s H. H. Dailey 1 (1000-ac), J. L. Reviere sur, 3½ mi se Navarro Crossing, dr 3460 ft. Peyton Bros. et al's J. P. Daniels 1 (100-ac), Juan M. Procella sur No. 70, ½ mi n Percilla, sp and sd.

LAMAR COUNTY—Cooper Bros. et al's L. B. Hayes 1, Luke Roberts sur, 1½ mi w Deport, elev 410 ft, sd 275 ft.

LEON COUNTY—Lone Star Gas Co.'s Sara Melasky 1 (81.98-ac), M. C. Lee sur No. 500, Buffalo area, Pecan chalk 3988-4128 ft, top Austin chalk 4990 ft, top Woodbine 5612 ft, td 5830 ft, run 7-in cas.

LIMESTONE COUNTY—J. S. Cosden, Jr. et al's J. J. Bower 1 (15-ac), J. Breeding sur, near Prairie Hill, dr 300 ft. Stanolind & Ramsey Pet. Corp.'s T. Norris 1 (40-ac), K. Thrasher sur, 5 mi n Kosse and on Thornton fault, elev 528 ft, Austin chalk 2791-2890 ft, top Woodbine 2980 ft, top Georgetown 3255 ft, first Glen Rose, 4026 ft, top first anhydrite 4886 ft, top Pettit 5375 ft, top Travis Peak 5528 ft, top lower Marine 7595 ft, top Marine lime 8525 ft, top salt 8995 ft, dr salt 9450 ft.

NAVARRO COUNTY—Natural Pet. Co.'s Karen Brown 1 (309-ac), W. T. Turner sur, 2 mi e Roane, elev 433 ft, dr 1520 ft. L. B. Orchard & A. G. W. Biddle's Guy M. Gibson 1, Isaac Bird sur No. 80, 6 mi sw Rural Shade, elev 328 ft, top Pecan chalk 2080 ft, Austin chalk 2950-3320 ft, top Woodbine 3704 ft, dr water sand 3860 ft. Mrs. Jane Robinson et al's Fortson 1, Eli Smith sur, 5 mi ne Corsicana, elev 345 ft, Austin chalk 1346-1585 ft, top Woodbine 2185 ft, sd in water 2240 ft.

SMITH COUNTY—John G. Mayo, Housh & Thompson, Inc.'s J. B. Mayfield 1 (130-ac), Wm. Keys sur, 4 mi se Tyler, rig. H. L. Hunt Unit Group's S. H. Bradley 1 (100-ac), Thos. P. Payne sur, A-763, Chapel Hill area, lower Trinity test, mim.

UPSHUR COUNTY—Tom Hunter-American Liberty Oil Co. et al's Dr. Chas. Carter 1 (80-ac), J. H. Fields sur, 1½ mi n Kelsey, elev 428 ft, Pecan chalk 2250-2690 ft, Austin chalk 3295-3332 ft, top Red Beds 5085 ft, top Paluxy 5590 ft, top anhydrite stringer 5978 ft, massive anhydrite 6520-6756 ft, basal anhydrite 6786-6807 ft, top Pettit 7405 ft, top Travis Peak 7525 ft, dr sandstone with salty taste 7740 ft.

EAST TEXAS BORDER COUNTIES

CASS COUNTY — V. A. Hughes & Co.'s Lyster 1, Wm. Bateman sur, top Georgetown lime 4215 ft, arr set csg, td 4380 ft (corrected depth). G. H. Vaughn's Ryley 1, J. Taylor sur, elev 216 ft, base massive anhydrite 5790 ft, coring 6130 ft. G. H. Chambless' White & Walker Lbr. Co. 1, J. J. Potter sur (280-ac), dr 4095 ft.

HARRISON COUNTY—Ark. Fuel Oil Co.'s C. M. Abney 1, Eason Little sur, set 7-in short string to shut off gas sand at 2440 ft, arr to deepen, td 4820 ft (Glen Rose).

PANOLA COUNTY—Preston et al's Rushing 1, Mannan Smith sur, twisted off, td 3276 ft. Texas Co.'s Claude Adams 1, Thos. Cox sur, 13⅜ in csg 579 ft, dr 5045 ft, hd lime and shale.

SHELBY COUNTY—Joe Burnham et al's George 1, C. C. Tutt sur, owdd, td 2950 ft.

LAREDO DISTRICT

DUVAL COUNTY—Argo's Bolte 1, sec 18, dk, mir. Atlantic's Gravis 1, sur 88, sp. Conroe's Trevino 1, Poitevent sur, mim. Cowan and Sorey's Taylor 1, sec 214, testing sand 1614-24 ft. Magnolia's Hoffman 1, sur 111, ru, dr wtr well. Petroleum Producers' Worden & Drought A-1, sur 159, mim.

McMULLEN COUNTY—Bennett's Nueces 3, sec 21, sp. Collins' Hagist 2, sec 33, dr 1050 ft. Day's Wulff 1, sec 77, dr 150 ft.

STARR COUNTY—Collins' Guerra 1, cor 6125 ft. Scarborough's Haden 1, por 80, lcn. Sun's Guerra D-2, La Sacatosa gr, dr 58 ft.

WEBB COUNTY—Gilcrease's Trafton 1, sur 282, fsg 1945 ft.

ZAPATA COUNTY—Calvin's Lopez 1, sur 253, dr 1524 ft. Falcon's Yzaguirre 1, por 14, dr 850 ft.

SAN ANTONIO DISTRICT

ATASCOSA COUNTY—Allison's Mischwitz 1, Garza sur, sp and sd. S.W.R.'s Miller 1, tr 89, Atascosa Colony Farms subd, sp and sd.

BEXAR COUNTY—Harrison, Fain & Smith's Schuwirth 1, Garza gr 2, dr 200 ft. Hickok & Reynolds' Ewert 1, York sur, dr 2124 ft. Parsynsen's Fee 1, Lindsay sur, sd 1600 ft. Philtop's Cassin 1, dr 1978 ft, Taylor Marl.

BURLESON COUNTY—Red Bank's Coffield 1, Santef sur, ru.

CALDWELL COUNTY—Adams' Teas 1, Miller sur, sd 2150 ft. Banks Miller's Martindale 1, McNeill sur 18, dr 1575 ft, top Ed/lime 1502 ft. Owens & Van Wagnen's Smith 1, fsg 2120 ft.

DIMMITT COUNTY—Teas & Maryland's McKnight 1, blk 13, sd, woo, 7116 ft, may set csg.

FRIO COUNTY—Pagenkopf & Jamieson's Houston 1, sur 151, still swabbing 2651 ft, showing o&g.

GUADALUPE COUNTY—Spiller's Wright 1, Cottle sur, dr 1682 ft.

MAVERICK COUNTY—Wellington's Chittim 1, sec 129, drlg below 4300 ft; Chittim A-1, swabbing at 2697 ft, in limestone, ran 8-in csg.

MEDINA COUNTY—Trentman & Merrit's Carle 1, sd 1410 ft.

MILAM COUNTY — Tuxedo's Graham 1, Cronea sur, dr 1135 ft; Graves 1, Robertson sur, dr 1147 ft.

CORPUS CHRISTI DISTRICT

BEE COUNTY—Dougherty's Beck 1, Uranga gr, testing sand 3680-95 ft.

DE WITT COUNTY — Hines' Boothe 1, Swindle sur, dr 1512 ft.

GOLIAD COUNTY—DeArman & Winward's Drier 1, sur 7, dr 3157 ft.

HIDALGO COUNTY—Gulf States' Cardenas 1, sh 156, wocs, 1800 ft. Johnson's Daskam 1, por 45, laying wtr line, td 215 ft. Smith's Fairbanks & Young 1, por 46, sd 7365 ft. Sun's Krebs 1, blk 16, ru.

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JACKSON COUNTY — Adams' Foust 1, White sur, dr 2667 ft. Harrison's Wearden 1, Williams sur, bldg dk. Humble's Davis 1, blk 150, lcn. Magnolia's West 1, Musquiz sur, dr 7084 ft.

JIM WELLS COUNTY—Howell's Goldapp 1, Welhausen subd, still testing around 3550 ft. Magnolia's Seeligson 8, Los Jaboncillos gr, dr 6021 ft. Pressnal & Mosser's Mortgage 1, La Vaca gr, ru and sd.

KLEBERG COUNTY—Pure's State 1, prep to build island.

LIVE OAK COUNTY — Chew & Hantho-Nelson's Bell 1, Parks sur, dr below 5076 ft. Culton's Wedding 2, Haughy sur, dr 1400 ft. Hickok & Reynolds' Land Bank 1, Henry sur, dr sdtr hole, otd 1308 ft. Martin's Adams 1, sec 25, dr 950 ft. Newton's West 1, Pieratt sur, dr below 957 ft. Parr's Brannon 1, sur 45, cor 4210 ft.

NUECES COUNTY—Andrade's Dunn 1, sur 422, testing, td 5830 ft. Camp's Wardner 4, Stratton subd, testing, td 6300 ft. Coastline's State 1, tr 314, bldg island. Corpus Christi's Howington 1, sur 156, dr below 540 ft. Morgan's Fee 1, sur 411, dr below 1000 ft. Renwar's Kenedy, sur 420, lcn; Morgan 1, sur 413, td 5842 ft, sd, woo. Richardson's Baldwin 1, Russell Farm Lots, dr 3550 ft; Cowles 1, sec 43, dr 6925 ft. Texon's Horne 1, Palo Alto gr, dr 5625 ft. Union's Brown 1, sec 87, dr 3650 ft; Galladay 1, R. Garcia gr, wocs, td 8190 ft; Rivers 4-A, Garcia gr, cor 6660 ft.

REFUGIO COUNTY—Barnsdall & Transwestern's Fagan 1, Fagan sur, dr 2350 ft. Continental's Scott 1, Reojas sur, dr 6525 ft. Hogan's Kelly 2, Power sur, sd 5660 ft, wo repairs. T-N & Winkler & Koch's Lambert 1, Refugio Town tr gr, cor 6860 ft.

SAN PATRICIO COUNTY—Bob's Green 2, Williamson sur, td 7100 ft, wo csg. Humble's Smith & Talbert 1, sec 37, pits dug, wo rig. Moore's Kelly 1, lot 24, dr 6210 ft. Smith's French-Shares 1, sec 65, wo permit. Stanolind's Vandenberg 1, cor 5440 ft.

WILLACY COUNTY — Magnolia's Armendiaz 1, Carricitos gr, wocs 8⅝ in csg 9635 ft, td 9641 ft. Sal Vieja's Garcia 2, sh 59, dr 5771 ft.

TEXAS GULF COAST

BRAZORIA COUNTY—Sam Dunnam's Settegast 1, Pearland area, T. J. Green sur, ru. Albert Plummer's Street 1, Pearland area, D. Hunter sur, dr shale 2160 ft. Pure's Smith 1, Peach Point area, S. F. Austin sur, abn 9830 ft; same operator's State Prison Farms 1, Peach Point area, S. F. Austin sur, dr shale 4750 ft. Luther C. Smith's Smith Fee 1, Flag Pond prospect, P. A. Rogers sur, lcn.

CHAMBERS COUNTY—A. A. Cameron's White 1, Canada Ranch prospect, S. Brill sur, dk. Laverne Decker's Broussard Trust 1, Double Gum Bayou area, H&TC Section 30, ru.

GALVESTON COUNTY — Sun Oil Co.'s Cade & Co. 1, Boliver prospect, A. Dickson sur, piling.

GRIMES COUNTY—Hubert & Holt et al's Greer 1, Carlos area, P. B. O'Connor sur, dr shale 2638 ft.

JEFFERSON COUNTY—I. E. Harwell's State 1, Gulf of Mexico, Block 72, reported dr shale 4750 ft. Humble's McFaddin-State 1, Gulf of Mexico, Tract 8, piling; same operator's Willis 1, north of Nome, J. Vannes sur, dr shale 5260 ft.

MATAGORDA COUNTY—Superior Drilling Co.'s P. Kruger 1, north of Van Vleck, C. Warren sur, making drill stem test 6703 ft. Sun's Robbins 1, north of Citrus Grove, C. H. Vandeveer sur, abn 10,160 ft.

WYOMING

BLAINE COUNTY—Burton & Hole's Waldrip 1, sw nw 12-32n-17e, dr 330 ft.

CARBON COUNTY — Miracle Oil Co.'s Bailey 2, cel ne ne 3-6s-23e, dr 2340 ft.

YELLOWSTONE COUNTY — Broadview Dome Oil Co.'s Halbritter 1, ne ne sw 18-3n-23e, coring 4550 ft.

COLORADO

BOULDER COUNTY—J. B. Furstenburg's Foote 1, se 20-1n-70w, abd 4230 ft.

CHEYENNE COUNTY—Gulf Oil Corporation's Union Pacific-Larsen 1, cse nw 13-13s-49w, testing after acidizing, td at 4813 ft.

County Ownership & Oilfield Maps
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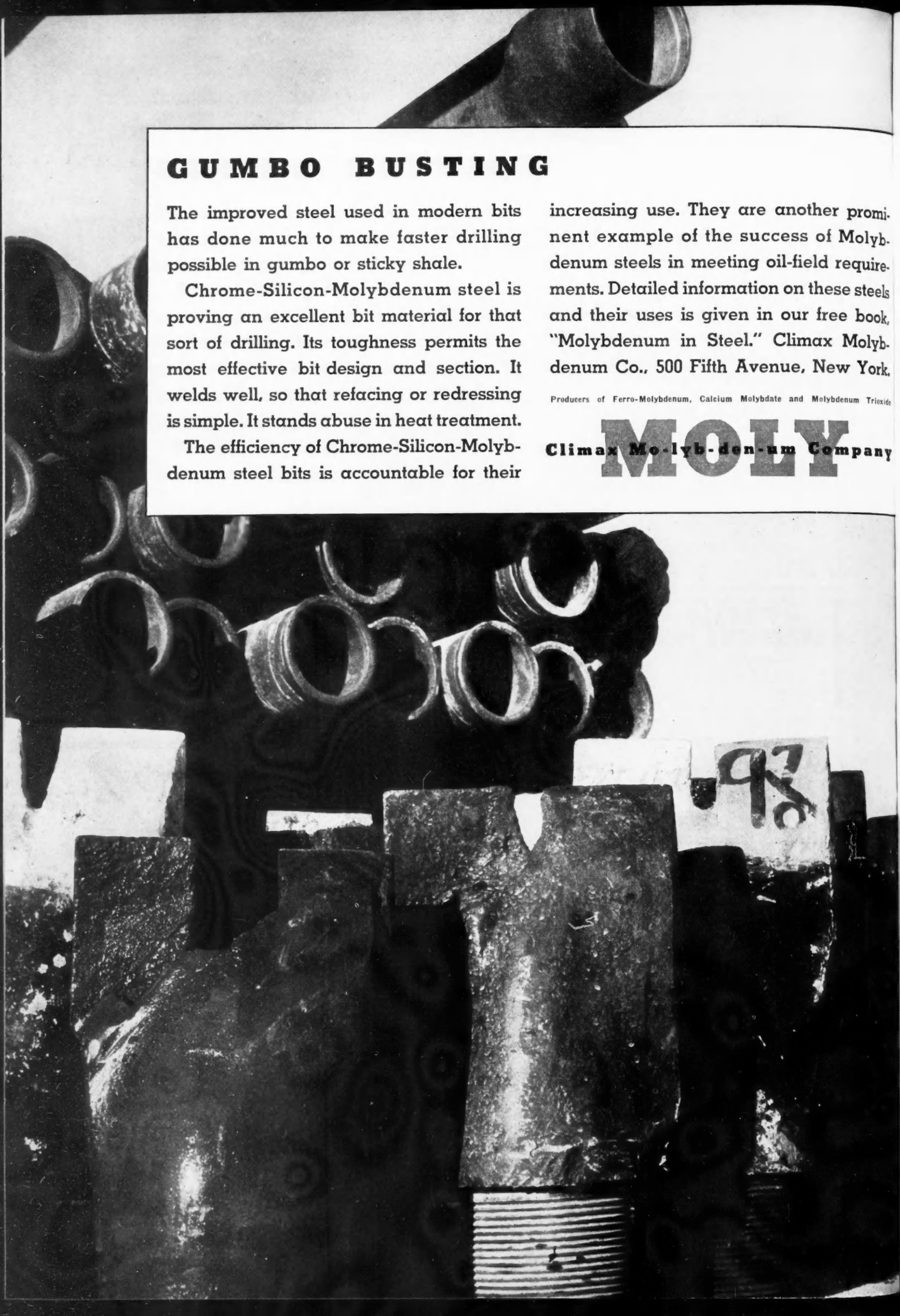

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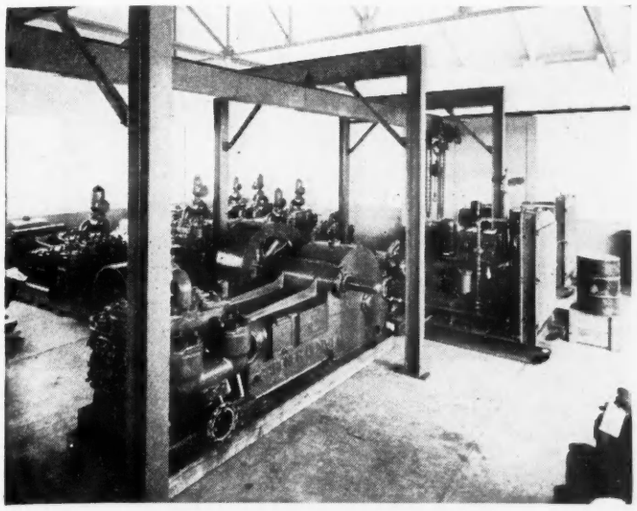
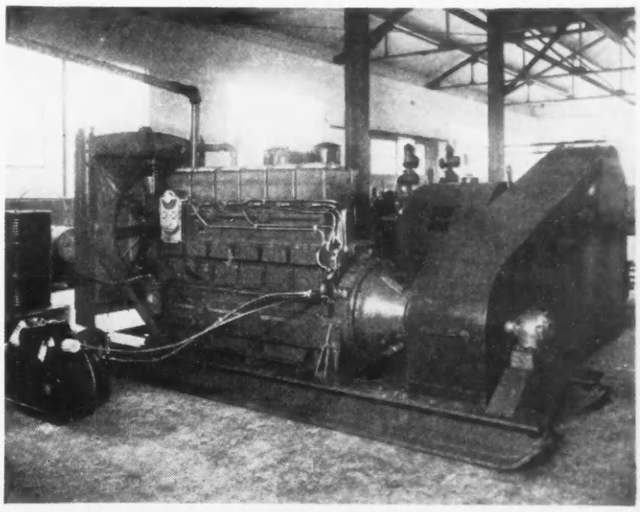
PORTABLE DIESEL RIG
Wagner-Morehouse, Inc.

A four-engined, portable Diesel drilling rig was recently delivered by the Wagner-Morehouse, Inc., Los Angeles oil well equipment suppliers to one of the major oil companies. The plant consists of two high-speed Cummins Diesel power units of the LP-601 type, that drive Gardner-Denver pumps, and a two-engine drilling rig built by Portable Rig Company. The rig is powered with two Cummins Diesels





Left and Above—Views of portable Diesel rig assembled by Wagner-Morehouse, Inc., using Cummins engines and standard units from other manufacturers.

of the LI-600 type. The engines for the pumps and the drilling rig each develop 200 horsepower at 800 r.p.m., and are identical to the scores of Cummins Diesels used extensively in the Texas-Oklahoma oil fields.

Wagner-Morehouse, Inc., is distributor for Gardner-Denver pumps as well as Portable Rig Company's products. Unusually fast delivery was made of the entire plant, there having been only a three-week period between the placing of the order and delivery.

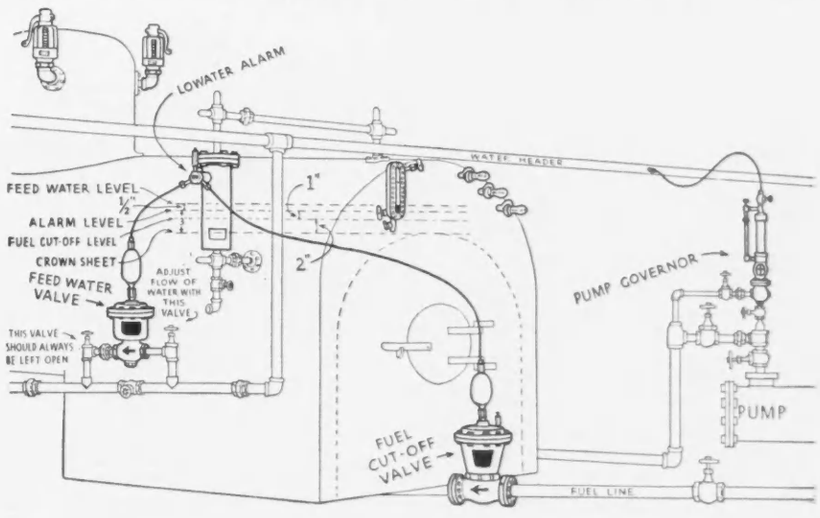
Th two Cummins LP-601 units that drive the pumps are mounted on structural steel skid type bases. At one end are the Young cooling radiators and fan assembly, and at the other end the Twin Disc clutches and Gates "vee" belt sheaves. An SKF bearing is at the extreme end of the base, to support the pulley shaft. These Cummins Diesels feature the low-pressure, distributor-type fuel-injection systems which gasify the fuel prior to injection. Air starting is used on the Type L Cummins Diesel.

FEED WATER CONTROL
The Inferno Company

The Inferno Company, Shreveport, Louisiana, has added a third device to its Lowater Alarm and Fuel Cut-Off Valve, to safeguard the operation of oil country boilers. The new feed water control is used with the Inferno Lowater Alarm and Fuel Cut-Off Valve to make up the Inferno Safety Unit. The Feed Water Control automatically holds the water in the boiler above the danger level, and within a 1-inch variation.

Installation is made as indicated by the accompanying diagram. Three valves, operated successively by a monel metal float in the Lowater Alarm, serve to turn on first, the Feed Water Control; second, the Lowater Alarm, if the water supply fails; and third, the Fuel Cut-Off Valve, if the Alarm is not attended.

The new Feed Water Control holds the water level between 3½ and 4½ inches above the crown sheet. If the water supply fails, the Lowater Alarm sounds a warning when the water level falls to 3 inches above the crown sheet. If that warning is ignored, a further drop of 1 inch in the water level causes the Fuel Cut-Off Valve to close the fuel line and keep it closed until turned on by hand.



CONVERTIBLE GAS AND DIESEL ENGINE
Fairbanks, Morse & Company

Fairbanks, Morse & Company, 600 South Michigan Avenue, Chicago, has announced a series of four-cycle, vertical, convertible Diesel and gas engines. This new Model 36-A-8 size is sturdy, medium-speed engines in the 200 to 300 horsepower range. Built in both 6- and 8-cylinder combinations, with 8-inch bore and 10½-inch stroke, they develop 35

WEBSTER SAYS:

re-pel', ri-pel', v. 1. To drive or keep away; check; repulse.

THAT'S WHY HOUGH CALLS THIS BALL AND SEAT

"REPELEX"

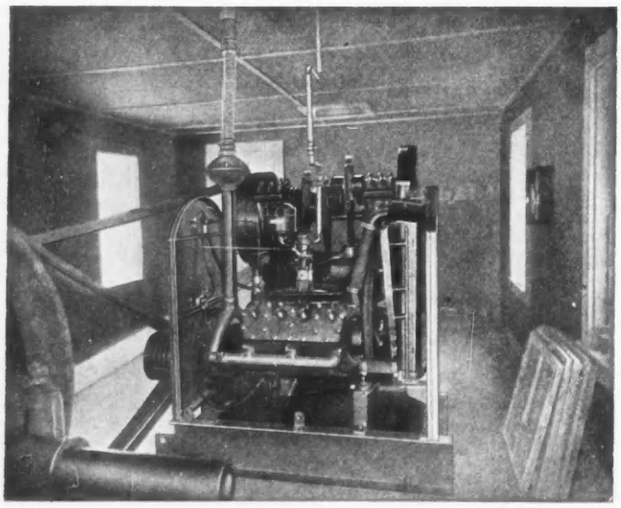
"REPELEX" . . . because it gives MAXIMUM RESISTANCE to rust, abrasion, and cutting action of sand . . . made of Stainless Steel. Six other specialized types at oil-field distributors. The Charles N. Hough Mfg. Co., Franklin, Pa., and Tulsa, Okla.

See Our Exhibit
INTERNATIONAL PETROLEUM EXPOSITION
TULSA
MAY. 14-21

HOUGH

Specialized **BALLS & SEATS**

HERE'S PROOF *of* DEPENDABILITY



This KRW Industrial Unit operating on natural gas fuel has been on 24-hour service since August 1936. Drives a triplex pump to maintain a water pressure of 250 to 300 lbs.

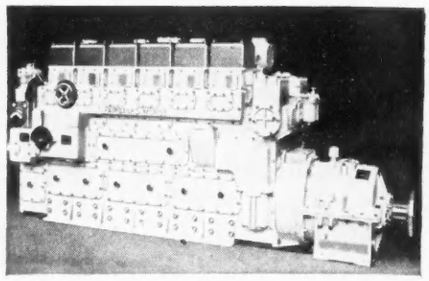
THE KRW INDUSTRIAL POWER UNIT using the FORD V-8, 85 Horsepower Engine Produces Dependable Power at the Lowest Cost. Pays for Itself Out of Savings in a Few Months.

K. R. WILSON, 20 Lock St., BUFFALO, N. Y.

Builders of Shop Equipment for Ford Dealers Since 1916
West Coast: 722 Mateo St., Los Angeles
Export Office: 90 West St., New York

horsepower per cylinder at 720 r.p.m. Smaller sizes of Model 36-A Diesel are available in ratings as low as 8 horsepower.

Both Diesel and gas engines in the new 8-inch cylinder size are offered for stationary service, and the Diesels are offered for marine propulsion and in complete, unit-built Fairbanks-Morse generating sets as well. The Diesels for marine service are direct-reversible, but can be furnished as non-reversible where such service requires.



Fairbanks-Morse Convertible Gas and Diesel Engine

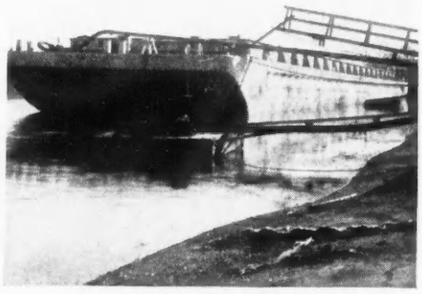
PRESSURE TYPE BARGES

Chicago Bridge & Iron Company

Chicago Bridge & Iron Company, 37 West VanBuren Street, Chicago, recently built four special type barges for a company operating on the Mississippi and Illinois rivers. They are of combined tank and cargo type, have a capacity of 1000 tons on a 7½-foot draft and are 180 feet long.

The cylinders are divided into six compartments. Each compartment has swash bulkheads every 40 feet and is equipped with complete valves and fittings. The compartments are designed for 15 pounds per square inch pressure but are operated with the valves set at 5 pounds per square inch.

The tops of the cylindrical tank sections are flattened and, together with intermediate floor sections, form a level cargo deck. This deck is surrounded by a welded plate railing with a division at the center. The barges are of welded plate construction throughout.

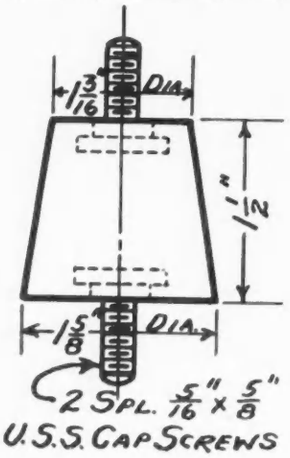


Barge built by Chicago Bridge & Iron Company

VIBRO-INSULATOR

The B. F. Goodrich Company

A new addition to their Vibro-Insulator line of rubber-to-metal type mountings has recently been announced by The B. F. Goodrich Company, Akron, Ohio. It is known as the Type 30 Vibro-Insulator and is made of a rubber compound having an exceptionally low permanent set. The rubber and metal parts of this unit are bonded together by the special Goodrich process of adhesion, and each insulator is provided with bolts for attaching to the equipment with which it is to be used.



The Type 30 Vibro-Insulator is designed to carry loads either in shear or compression. When loaded in shear each Type 30 mounting will carry a load of 30 pounds. When loaded in compression it will support a load of 120 pounds. In either case the deflection is ⅜-inch, providing for a minimum machine frequency of 925 per minute. Type 30 Vibro-Insulators are particularly useful in compression as mountings for air compressors and refrigerating units.

This Week with the Industry's EQUIPMENT SUPPLIERS

S. R. Thomas Now Chief Engineer Of Bantam Bearings Corporation

S. R. Thomas has been appointed chief engineer of Bantam Bearings Corporation, South Bend, Indiana.

For the past year and a half Thomas has been manager of the Automotive Bearing Division coming to Bantam after an association of four years with Cord interests where he was chief engineer of Auburn, Cord and Duesenberg.

S. R. THOMAS
Chief Engineer Bantam Bearings Corporation.

The company's announcement says this advancement is made to utilize more broadly his 24 years experience in a wide variety of engineering projects and to consolidate under one head the widening scope of engineering development at Bantam. He will continue in charge of the automotive work.

Jarecki Manufacturing Company Adds to Sales Force at Tulsa

Jarecki Manufacturing Company has added Albert S. Wasson to its Tulsa sales force. Wasson has spent five years in the supply business, having formerly been with Oil Well Supply Company at Ada, Oklahoma, as field salesman. Previous to that he was store manager at Fittstown, Oklahoma, for Atlas Supply Company.

E. L. Whitney District Manager For Humphrey Steel Products

Humphrey Steel Products Company, Dallas, has appointed E. L. Whitney of Tulsa district manager for the sale of pumping units and derricks in Oklahoma and Kansas.

S. MENSONIDES

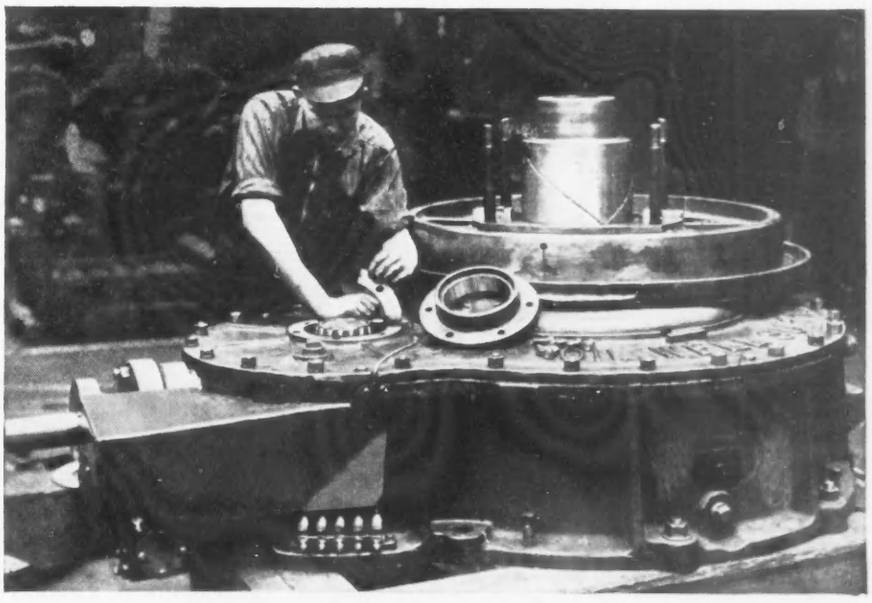
S. Mensonides, vice president in charge of oil field sales for Farrar & Trefts, Inc., has returned from a two months' trip in the East, where he visited the company's home office in Buffalo, New York, and eastern oil fields.

Mensonides has offices with the Continental Supply Company in Dallas.

LEWIS M. PARSONS
Newly elected vice president in charge of sales and a director of Jones & Laughlin Steel Corporation, Pittsburgh

After leaving University of Pennsylvania in 1917 where he was on the varsity crew and the freshman football and swimming teams, class of 1919, to join the Navy during the World War in the destroyer service and later in the Naval Flying Corps, young Parsons entered the employ of Bethlehem Steel Company in the sales division. He was made assistant manager of sales, Philadelphia office, in 1932, and manager of sales at the same office in 1936.

With Jones & Laughlin Steel Corporation, effective March 1, he has en-



In the assembly aisle of Oil Well Supply Company, Oil City, Pennsylvania, the intermediate shaft tapered roller bearings on "Oilwell" 50-horsepower Eccentric Type Geared Pumping Power are being adjusted for running clearance. Laminated shims—solid shims that peel for adjustment, made by Laminated Shim Company, hold the clearance within the close limits necessary to insure proper performance and long life of bearings. This permanent adjustment feature helps maintain machine efficiency throughout field service.

SIMPLEX JACKS
Emergency Jacks
Riggers' Jacks
Pull Rod Jacks
and Jacks for every
Oil Field Need

STOCKED BY LEADING SUPPLY HOUSES
TEMPLETON, KENLY & CO., CHICAGO

Standco
NO-SMOKE
STANDCO BRAKE LINING
Nothing novel—no bunk—but it gets the job done without scoring brake rims. See page 1940, Composite Catalog.
STANDARD BRAKE LINING CO.

NABORS TRAILERS
PRICE REDUCTIONS
Lowest Base Prices in this Company's History
W. C. NABORS COMPANY
MANSFIELD, LA.
Houston Dallas Memphis
Jackson Montgomery

TAGS
for your every need
A complete line of shipping and merchandising tags—Including those for your special requirements . . . Prompt personal service that saves you time and money.
ALL KINDS OF BUSINESS ENVELOPES . . . We manufacture and print envelopes of every description—built to give maximum utility, security and economy.
GULF
ENVELOPE CO.
617 Brooks St. P.O. Box 164
Phone Fairfax 4171

tire charge of all sales activities, including district sales office in the following cities: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Houston, Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco, Seattle, Tulsa, and Toronto, Canada; and warehouses at Chicago, Cincinnati, Detroit, Memphis, New Orleans, New York, and Pittsburgh.

Westinghouse Elects George Bucher President

George H. Bucher, executive vice president of Westinghouse Electric & Manufacturing Company, has been elected president of the company. Frank A. Merrick, president since 1929, was elected vice chairman. The announcement was made by A. W. Robertson, chairman, following a meeting of the board of directors at the company's New York Offices.

Paul Judson Myler, president of Canadian Westinghouse Company, became a director of the Westinghouse Electric & Manufacturing Company at the same meeting.

Fred E. Cooper Buys Airplane

Fred E. Cooper, Tulsa, recently purchased a five-place Stinson cabin plane.

Cooper feels that the plane will enable him to maintain a closer contact with his branch offices at Los Angeles, California, and at Longview, Texas, and at the same time will permit him to have more personal contacts with his customers throughout the United States and Mexico.

Waukesha Motor Company Declares Dividend

Waukesha Motor Company, Waukesha, Wisconsin, recently declared a regular quarterly dividend of 25 cents per share on the common stock of $5.00 par value to stockholders of record as of March 15, 1938.

Reported earnings for the first half of their fiscal year amounted to $265,-864.74, equivalent to 0.666 per share after depreciation of fixed assets and provision for federal and state income taxes, but before reserve for undistributed profits tax

Morse Chain Company Changes Sales Organization

Morse Chain Company, Ithaca, New York, recently announced the following changes in its sales organization:

Arthur F. Weston becomes manager of the Chicago office. Weston was formerly in charge of the company's Cincinnati branch. Wm. C. Gilbert, formerly of the Detroit office, has been transferred to Chicago. C. A. Shetter, formerly manager of the Cleveland office becomes manager of the Cincinnati branch, and Lon Sloan, formerly special development engineer at Chicago, becomes manager of the Cleveland office.

New Geophysical Company

A new geophysical company has recently been organized in Houston under the name of Continental Exploration Company, with headquarters in the M. & M. Building. This company is engaged in geophysical contract work, specializing in torsion balance surveys.

Hardwicke's Petroleum Bibliography is praised

"The secret of being well informed on a given subject rests upon the ability of an inquiring mind to know where to find information and perseverence to follow up leads to reference material," states H. C. Folwer, senior petroleum engineer of the United States Bureau of Mines. "To that end," he continues, "Robert E. Hardwicke, author of Petroleum and Natural Gas Bibliography, set himself the Herculean task of going to the sources."

Hardwicke has chosen a unique and commendable way of making his bibliography generally available. Upon completing the manuscript to the satisfaction of himself and his critical reviewers, he unselfishly donated his work to the University of Texas, free of all financial interest. Any profits from the sale of volumes are to be used in extending the petroleum and natural-gas library of the University of Texas.

Hardwicke's bibliography is the first systematic attempt given to the public wherein some orderly arrangement of titles has been brought out of the chaotic mass of written words contained in books on petroleum and related subjects. The author wisely has limited his bibliography to fall within a comprehensive definition of "book literature," as it would not have been feasible to include citations to all outstanding contributions on oil and gas appearing in current periodical publications. However, the volume does list indexes and other compilations relating to periodical literature and gives reference to available publication lists of various agencies of the United States Government concerned with petroleum and allied substances; also, transaction volumes and similar publications of technical societies and trade associations are cited.

One section of the book caused the author considerable difficulty and presented problems of identification. Nevertheless, in section IX, comprising 15 pages of the 167 page volume, the author has been able to give nearly 100 separate references to hearings, investigations, reports, and findings of a political nature pertaining to petroleum and natural gas, arranged under branches of Congress, departments, and bureaus of the federal government. No other similar list has been found.

The bibliography should be helpful especially to members of the legal profession who are interested in the law of oil and gas. A complete list is given of all articles, notes, and comments on oil and gas law that have been found in legal periodicals published in the United States (Section VIII).

The author does not present his book as a complete bibliography of petroleum and natural gas. However, a statement made as a part of the title-page, at the end of his breath-taking description of its contents, namely, "a reasonably complete guide to the literature in English dealing with petroleum and natural gas," is conservative and prompted by modesty.

Hardwicke has divided his index material into 11 major divisions, and several of these have as many as 7 subdivisions. In this manner he lays before the reader the vast book literature pertaining to petroleum and natural gas.

Squeaks from the Bull Wheel

A Wee Visitor

A little boy called on his aunt, who lived next door. "Hello, Aunt Sue," he greeted her, "nice day." Then, after a minute's embarrassed pause, he came to the point, "Aunt Sue, I smell something that smells like pie with raisins in it."

"Yes, Billy, I have some mince pies, but they're for company."

He pondered this and then suggested hopefully, "I came to make a little bit of a visit myself."

Bills

"I put on another suit and in one of the pockets found a big roll of bills which I had entirely forgotten."

"Were any of them receipted?"

Serves Him Right

Seventeen thousand Italians killed in Spain and about three thousand French and five thousand Germans—and one Spaniard.

Serves him right. What's he want to interfere for?

Irish

"Does this package belong to you? The name is obliterated."

"No, that can't be mine. My name is O'Brien."

She Knew Them

"Briggs, Blower and Boz," he began. "Union Building, New York City."

He cleared his throat.

"Gentlemen," he went on.

The secretary looked up.

"I beg to differ with you," she stated coldly. "I've been out with the three of them!"

Financial Ode

Owe $50 you're a piker.
Owe $50,000 you're a business man.
Owe $50,000,000 you're a tycoon.
Owe $5,000,000,000 you're a government.

Poor Subject

The man went to the insurance office to have his life insured.

"Do you drive?" the insurance agent asked.

"No," informed the applicant.

"Do you fly?"

"No."

"Sorry, sir," snapped the agent curtly, "but we no longer insure pedestrians."

The Adjective Slinger

"You were sent here, I believe, for writing a glowing prospectus for an oil company."

"Yes," said the prisoner; "I was a little too optimistic."

"Well," went on the warden, "the authorities want a report on conditions in this prison. I've decided to let you write it."

Shhh!

"Transfer, please."

"Where to?"

"I can't tell you. It's a surprise party."

Wasting No Time

"Oh, Walter," she said, "dad's going to give us a check for a present!"

"Good! Then we'll have the wedding at noon instead of 2 o'clock!"

"But, why dear?"

"The banks close at 3!"

Free From Care

Coroner—Had the deceased any financial worries?

Witness—None at all. He was bankrupt.

One Comfort

A movie star finished building and furnishing her 12-room "shack" in Beverly Hills, then sent home for the folks.

"Faith and bejabbers," muttered her dad, after giving the palatial home the once-over.

"Why don't you go sit in the patio?" suggested the daughter.

"Do I have to?" asked dad.

"Yes, go sit in the patio!" added the girl's mother.

"All right," the old man consented. "Where is it?"

"Outside," said the daughter.

"Thank heaven," muttered the old fellow, shuffling away. "That's SOMETHING like the old days, anyway."

Experienced

Warden. "We must set you to work. What can you do?"

Forger: "Give me a week's practice and I will sign your checks for you."

Poor Aim

"Melvin! Melvin!"

"What, ma?"

"Are you spitting in the fish bowl?"

"No, but I been comin' pretty close."

Conflict

"This is the skull of a man who was shipwrecked for two years on a desert island with two pretty chorus girls."

"How did he die?"

"He wore himself out tearing down the signals they put up."

Early Start

"You ought to be ashamed of yourself," His Honor began, "assaulting your wife like that. I never saw a nastier black eye. "Do you know of any reason why I shouldn't send you to prison?"

"If you do," answered the defendant, "it will break up our honeymoon."

The Old Goat

"What did the boss say when you asked him for a raise?"

"He was just like a lamb."

"What did he say?"

"Baa."

All Depends

"How old would a person be who was born in 1890?"

"Man or woman?"

Wife Control

Two Aberdonian friends were traveling in a train when one of them pulled out his handkerchief, from which there fell a set of false teeth. His friend looked at them in surprise, remarking, "I wasna aware you had false teeth, Mac." "False teeth!" exclaimed his friend; "I have no false teeth in my heid. That lot's the wife's. She's developed that perneecious and extravagant habit of eating between meals, and I just had to put a stop to it somehow!"

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WATER COOLER
PURE WATER
GOTT WATER COOLER
Made in 3, 5, 8, 10, and 20 gallon sizes.
Gotkool
WATER CANS & COOLERS
GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug fitting large removable top, handy non-leaking push button faucet. GOTT Water Cans for handy field use. Your Supply Store has them, get one today! . . . .
GOTT WATER CAN
Made in 1½, 3, 5, and 10 gallon sizes.
H. P. GOTT MFG. CO.
WINFIELD, KANSAS
KEEP PURE DRINKING WATER ALWAYS HANDY

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Pyramid Manufacturing Co.	—
Raybestos-Manhattan	—
R-F Electrical Manufacturing Co.	—
Reading-Pratt & Cady Co.	21
Rector Well Equipment Co.	—
Reda Pump Co.	49
Reed Roller Bit Co.	28-29
The Republic Rubber Co.	—
Republic Steel Corp.	—
The Rice Hotel	—
Rieber Laboratories	—
The Ridge Tool Co.	—
Rollway Bearing Co.	—
Royal Manufacturing Co.	—
Ryder Scott Co.	—
Jack A. Schley	107
Schlumberger Well Surveying Corp.	—
Second National Bank, Houston	—
Security Engineering Co.	—
Seismograph Service Corp.	—
Shaffer Tool Works	—
Shell	—
Sinclair Refining Co.	—
SKF Industries, Inc.	41
A. O. Smith Corp.	—
E. M. Smith Co.	—
Howard Smith Co.	—
The Sonner Burner Co.	—
South Chester Tube Co.	—
Southern Engine & Pump Co.	—
Southern Pacific Lines	—
Hotel Southland	—
Spang & Co.	—
Spang Chalfant, Inc.	—
Sperry-Sun Well Surveying Co.	97
Standard Brake Lining Co.	112
Standard Pressed Steel Co.	103
Stanley Tools	—
Star Drilling Machine Co.	—
Sterling Engine Co.	—
Stevens Hotel	—
Sullivan Machinery Co.	—
Templeton, Kenly & Co.	112
Texaco Development Corp.	—
The Texas Co.	38-39
Texas Electric Service Co.	—
Texas Electric Steel Casting Co.	—
Texas Iron Works	—
Texas Steel Co.	—
Thermoid Rubber Co.	—
Thornhill-Craver Co.	—
Thornton Tandem Co.	—
The Timken Roller Bearing Co.	19
The Titusville Iron Works Co.	—
Tretolite Co.	37
Trimont Manufacturing Co.	—
Trinity Portland Cement Co.	—
Twin Disc Clutch Co.	—
Union Carbide & Carbon Corp.	57
Union Wire Rope Co.	—
Unit Rig & Equipment Co.	—
United Gas System	—
United States Rubber Products, Inc.	61
United States Steel Corp.	—
United Supply & Manufacturing Co.	—
Universal Atlas Cement Co.	—
Wailes Dove-Hermiston Corp.	—
Warner & Swasey Co.	—
The Watson-Stillman Co.	107
Waukesha Motor Co.	—
Well Equipment Manufacturing Co.	—
Westinghouse Electric & Mfg. Co.	—
Wheeling Steel Corp.	—
Wheeling Machine Products Co.	—
The Wheland Co.	—
Wickwire Spencer Steel Co.	—
J. H. Williams & Co.	—
K. R. Wilson	110
Wilson Manufacturing Co.	—
Wilson Supply Co.	51
W-K-M Co.	27 and 75
The Wood Shovel & Tool Co.	—
Worthington Pump & Machinery Corp.	—
Young Engine Corp.	—
Young Radiator Corp.	—
Youngstown Sheet & Tube Co.	—
Zingery Oil Map Co.	107

THIS LARKIN SAND PUMP

- **will clean out faster than any other pump on the market!**
- **will completely pay for itself in a very short time!**

FOR getting the sediment, cavings, sand and iron drillings all out of the well quickly — Larkin Sand Pumps simply haven't an equal. They pick up **more** sand — they pick up **larger** objects. Buying them is a mighty good investment that pays well and pays quickly!

Larkin Sand Pumps are made of a cold-drawn seamless tube, in any length desired. All parts are made with gauges; this allows the rapid and accurate replacing of worn-out parts without the expense of shop work. And all parts can be replaced right on location!

Larkin Sand Pumps are made in either the Wire-Line or the Steel Plunger type. A longer stroke may be had, with no higher derrick, when the Wire-Line Plunger Pump is used.

Save money — **buy** Larkin Sand Pumps!

Bit Bottom

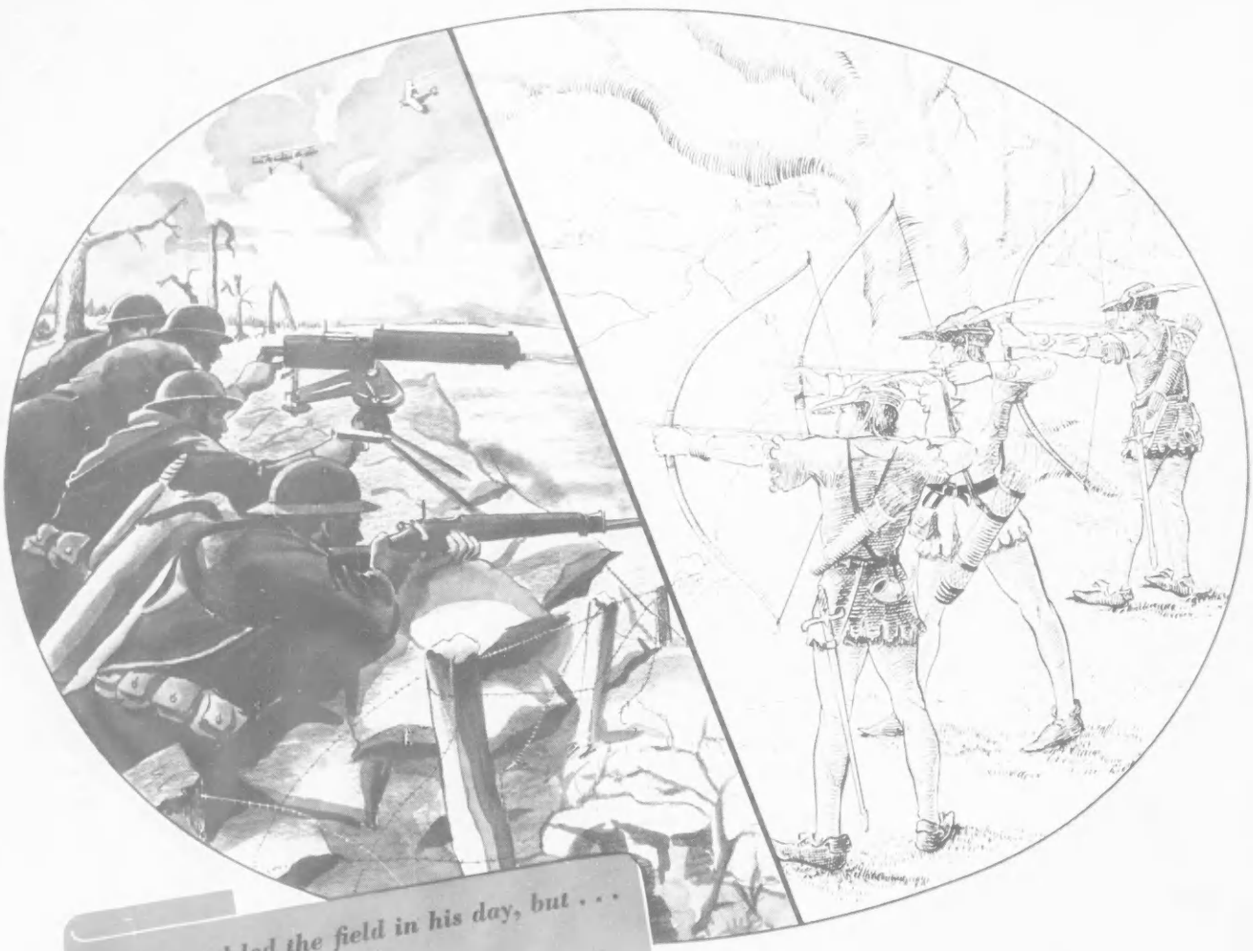
AT ALL SUPPLY STORES

Warehouse stock at Tulsa, Okla., Houston, Kilgore and Odessa, Texas; Shreveport, La., and Great Bend, Kansas

LARKIN PACKER COMPANY, INC.

ST. LOUIS U. S. A.

LARKIN PACKER CO.



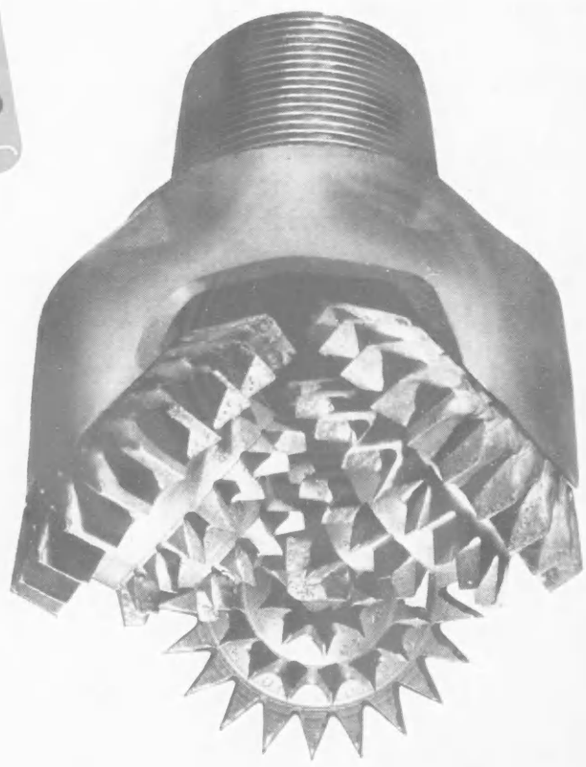
Robin Hood led the field in his day, but . . .

IT TAKES

MODERN EQUIPMENT

TO "WHIP"

MODERN PROBLEMS



Hughes Tricone Bits lead the field in attacking formations encountered in modern drilling.

With a Hughes "Tailor - Made" Rock Bit on bottom, your drill stem is equipped with the most modern weapon for combating today's complex drilling problems. Specialize with a Hughes Tricone . . . specially designed for specific formations.

HUGHES TOOL COMPANY - HOUSTON, TEXAS, U. S. A.

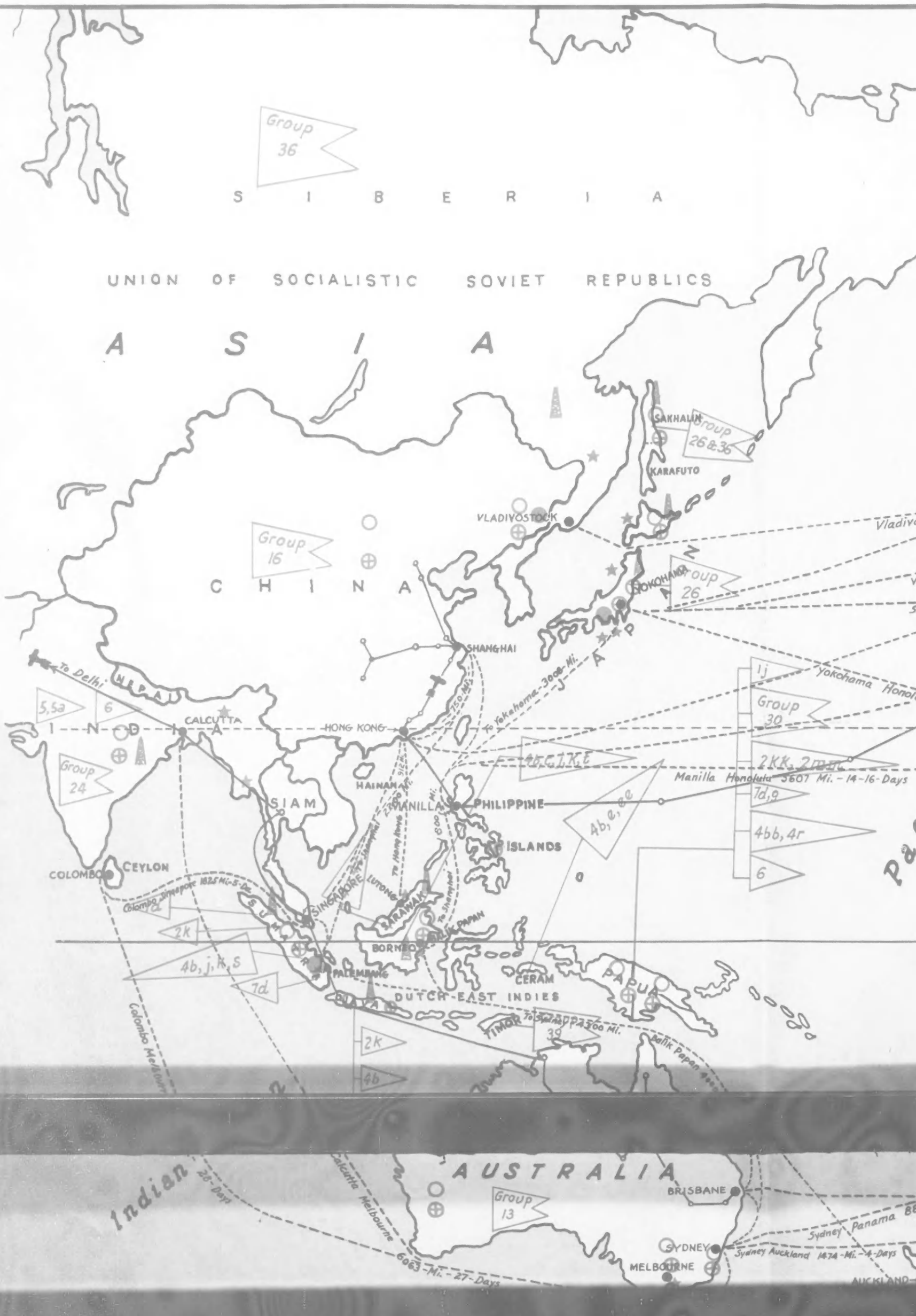
World Crude Oil Production, by

Complete Production Histo

(Sources—*Mineral Resources of the United States*, 1918, 193
The figures of *Mineral Resources*, 1918, have been replaced here

YEAR	Rumania	United States	Italy	Canada	Russia except Sakhalin	Poland (Galacia)	Japan and Taiwan	Germany	India (British)	Nether-land India	Peru	Mexico	Argentina	Trinidad
Prior to 1928....	274,240,176	10,376,828,766	1,327,718	26,733,770	2,246,959,907	207,777,251	54,962,035	18,596,041	181,863,365	364,783,621	82,989,855	1,464,320,162	43,208,001	38,001,391
1928.....	30,773,000	901,474,000	46,000	624,000	[C]84,745,000	5,492,000	1,944,000	630,000	8,741,000	32,118,000	12,006,000	50,151,000	9,070,000	7,684,000
1929.....	34,758,000	1,007,323,000	45,000	1,117,000	[C]99,507,000	4,988,000	2,023,000	704,000	8,747,000	39,279,000	13,422,000	44,688,000	9,391,000	8,716,000
1930.....	42,759,000	898,011,000	59,000	1,522,000	[C]125,555,000	4,904,000	2,047,000	1,222,000	8,887,000	41,729,000	12,449,000	39,530,000	9,002,000	9,419,000
1931.....	49,741,000	851,081,000	124,000	1,543,000	162,842,000	4,662,000	1,966,000	1,608,000	8,715,000	35,539,000	10,089,000	33,039,000	11,709,000	9,744,000
1932.....	53,815,000	785,159,000	208,000	1,044,000	154,367,000	4,116,000	1,630,000	1,608,000	8,817,000	39,001,000	9,899,000	32,305,000	13,139,000	10,126,000
1933.....	54,020,000	905,656,000	204,000	1,145,000	154,840,000	4,072,000	1,455,000	1,665,000	8,743,000	42,606,000	13,257,000	34,001,000	13,691,000	9,561,000
1934.....	62,063,000	908,065,000	151,000	1,417,000	174,318,000	3,913,000	1,834,000	2,187,000	10,503,000	46,925,000	16,314,000	38,172,000	14,024,000	10,894,000
1935[F].....	61,371,000	961,440,000	112,000	1,447,000	182,386,000	3,812,000	2,250,000	2,967,000	9,218,000	42,319,000	17,067,000	40,241,000	14,295,000	11,671,000
1936[F].....	63,750,000	1,099,687,000	116,000	1,508,000	189,941,000	3,777,000	2,445,000	3,087,000	9,619,000	44,203,000	17,595,000	41,028,000	15,455,000	13,237,000
1937[F].....	53,100,000	1,277,364,000	150,000	2,670,000	196,141,000	3,485,000	2,689,000	3,143,000	9,810,000	50,000,000	17,455,000	46,000,000	16,300,000	15,500,000
Total all years through 1937...	780,390,176	19,972,088,766	2,542,718	40,770,770	3,771,601,907	250,998,251	75,265,035	37,417,041	273,663,365	777,872,621	222,562,855	1,863,975,162	169,284,001	144,553,391

[B] No more data available.
[C] Year ended September 30.
[D] Beginning of production from Brunei.
[E] Less than one thousand barrels.



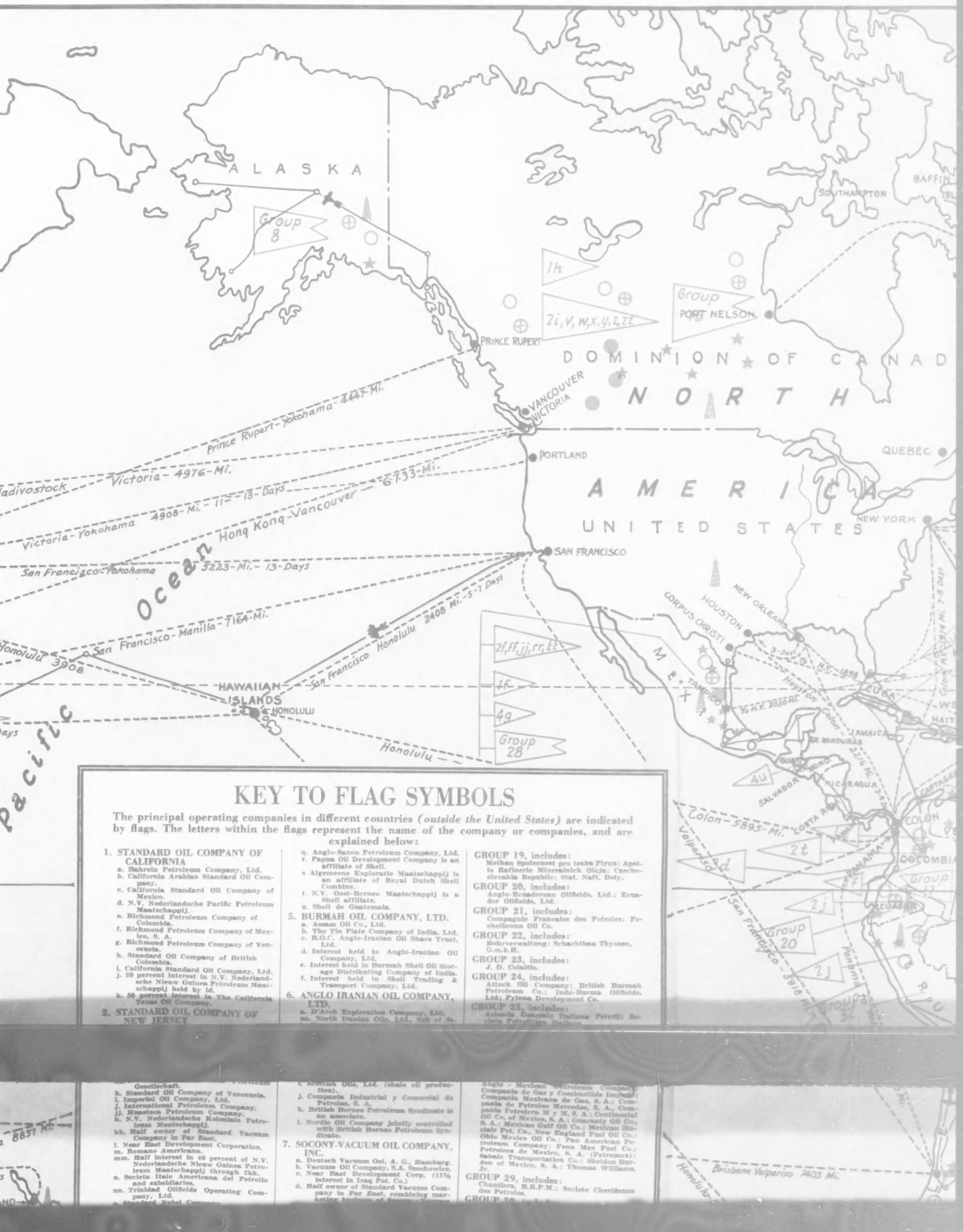
by Countries, by Years, for Past 10 Years

n History of World, in Barrels of 42 U. S. Gallons

, 1930 and 1931; *Minerals Yearbook*, 1932, 1933 and subsequent years. Note:
d here by figures from later reports, in cases where revisions have been made.)

nidad	Egypt	Iran (Persia)	British Borneo (Sarawak and Brunei)	Algeria	Ecuador	Venezuela	France	England	Czecho-slovakia	Sakhalin	Colombia	Iraq	Bolivia	Bahrein Island	Other Coun-tries	Total World	Percent Produced by United States	YEAR
001,391	15,469,000	257,910,000	30,287,000	99,000	1,455,000	138,124,000	4,380,000	19,000	901,000	806,000	23,725,000	338,000	.....	.....	634,000	15,821,315,012	65.5	.... Prior to 1921
684,000	1,842,000	43,461,000	[D]5,223,000	8,000	1,084,000	105,749,000	512,000	1,000	94,000	677,000	19,897,000	713,000	.....	.....	15,000	1,324,774,000	68	1926
716,000	1,868,000	42,145,000	5,290,000	20,000	1,381,000	137,472,000	535,000	[B]	93,000	[C]1,134,000	20,385,000	798,000	[E]	.....	38,000	1,485,867,000	68	1927
419,000	1,966,000	45,833,000	4,907,000	16,000	1,553,000	136,669,000	523,000	[E]	157,000	[C]1,805,000	20,346,000	909,000	58,000	.....	40,000	1,411,905,000	64	1928
744,000	2,038,000	44,376,000	3,854,000	[B]	1,762,000	116,613,000	527,000	[B]	134,000	2,734,000	18,237,000	900,000	25,000	.....	54,000	1,373,656,000	62	1931
126,000	1,895,000	49,471,000	3,796,000	[B]	1,597,000	116,541,000	530,000	[B]	126,000	2,631,000	16,414,000	836,000	44,000	.....	62,000	1,309,677,000	60	1932
561,000	1,663,000	54,392,000	4,490,000	[B]	1,620,000	117,720,000	562,000	[B]	122,000	2,338,000	13,158,000	917,000	112,000	31,000	71,000	1,442,112,000	63	1933
894,000	1,546,000	57,851,000	5,140,000	[B]	1,637,000	136,103,000	557,000	[B]	178,000	2,881,000	17,341,000	7,689,000	159,000	285,000	98,000	1,522,343,000	59.7	1934
671,000	1,295,000	57,304,000	5,389,000	2,000	1,732,000	148,529,000	539,000	[B]	140,000	2,545,000	17,598,000	27,311,000	163,000	1,265,000	594,000	1,650,158,000	60.4	F1935
237,000	1,223,000	61,728,000	4,720,000	2,000	1,951,000	155,229,000	535,000	[B]	131,000	2,218,000	18,756,000	29,406,000	160,000	4,645,000	552,000	1,788,704,000	61.5	F1936
500,000	1,163,000	73,383,000	4,500,000	2,000	2,168,000	182,751,000	544,000	[B]	121,000	2,380,000	20,006,000	31,171,000	[E]	8,600,000	573,000	2,021,171,000	63.2	F1937
553,391	31,968,000	788,034,000	77,956,000	149,000	17,940,000	1,491,320,000	9,734,000	20,000	2,197,000	22,149,000	205,863,000	100,988,000	719,000	14,826,000	2,731,000	31,149,582,012	64.1	Total all years through 1937

F For 1935, 1936 and 1937 figures for countries outside the United States are preliminary, having been estimated by THE OIL WEEKLY, with aid of government and other sources.



KEY TO FLAG SYMBOLS

The principal operating companies in different countries *(outside the United States)* are indicated by flags. The letters within the flags represent the name of the company or companies, and are explained below:

1. STANDARD OIL COMPANY OF CALIFORNIA
- a. Bahrein Petroleum Company, Ltd.
- b. California Arabian Standard Oil Company.
- c. California Standard Oil Company of Mexico.
- d. N.V. Nederlandsche Pacific Petroleum Maatschappij.
- e. Richmond Petroleum Company of Colombia.
- f. Richmond Petroleum Company of Mexico, S. A.
- g. Richmond Petroleum Company of Venezuela.
- h. Standard Oil Company of British Colombia.
- i. California Standard Oil Company, Ltd.
- j. 50 percent interest in N.V. Nederlandsche Nieuw Guinea Petroleum Maatschappij held by ld.
- k. 50 percent interest in The California Texas Oil Company.

2. STANDARD OIL COMPANY OF NEW JERSEY
- Gesellschaft.
- h. Standard Oil Company of Venezuela.
- i. Imperial Oil Company, Ltd.
- j. International Petroleum Company.
- jj. Huastaca Petroleum Company.
- k. N.V. Nederlandsche Kolonniale Petroleum Maatschappij.
- kk. Half owner of Standard Vacuum Company in Far East.
- l. Near East Development Corporation.
- m. Romano Americana.
- mm. Half interest in 40 percent of N.V. Nederlandsche Nieuw Guinea Petroleum Maatschappij through kkk.
- n. Societa Italo Americana del Petrolio and subsidiaries.
- nn. Trinidad Oilfields Operating Company, Ltd.
- o. Standard Nobel Company.
- q. Anglo-Saxon Petroleum Company, Ltd.
- r. Papua Oil Development Company is an affiliate of Shell.
- s Algemeene Exploratie Maatschappij is an affiliate of Royal Dutch Shell Combine.
- t. N.V. Oost-Borneo Maatschappij is a Shell affiliate.
- u. Shell de Guatemala.

5. BURMAH OIL COMPANY, LTD.
- a. Assam Oil Co., Ltd.
- b. The Tin Plate Company of India, Ltd.
- c. B.O.C. Anglo-Iranian Oil Share Trust, Ltd.
- d. Interest held is Anglo-Iranian Oil Company, Ltd.
- e. Interest held in Burmah Shell Oil Storage Distributing Company of India.
- f. Interest held in Shell Trading & Transport Company, Ltd.

6. ANGLO IRANIAN OIL COMPANY, LTD.
- a. D'Arch Exploration Company, Ltd.
- aa. North Iranian Oils, Ltd., Sub of 3a.
- l. Scottish Oils, Ltd. (shale oil production).
- j. Compania Industrial y Comercial de Petroleo, S. A.
- k. British Borneo Petroleum Syndicate is an associate.
- l. Nordic Oil Company jointly controlled with British Borneo Petroleum Syndicate.

7. SOCONY-VACUUM OIL COMPANY, INC.
- a. Deutsch Vacuum Oel, A. G., Hamburg.
- b. Vacuum Oil Company, S.A. Szechowice.
- c. Near East Development Corp. (11⅓% interest in Iraq Pet. Co.)
- d. Half owner of Standard Vacuum Company in Far East, combining marketing business of Socony-Vacuum

GROUP 19, includes:
Methan Spolecnost pro tezbu Plynu; Apollo Rafinerie Minerainich Oleju; Czechoslovakia Republic; Stat. Naft. Doly.

GROUP 20, includes:
Anglo-Ecuadorean Oilfields, Ltd.; Ecuador Oilfields, Ltd.

GROUP 21, includes:
Compagnie Francaise des Petroles; Pechelbronn Oil Co.

GROUP 22, includes:
Bohrverwaltung; Schachtbau Thyssen, G.m.b.H.

GROUP 23, includes:
J. D. Colaitis.

GROUP 24, includes:
Attock Oil Company; British Burmah Petroleum Co.; Indo-Burma Oilfields, Ltd; Prijana Development Co.

GROUP 25, includes:
Azienda Generale Italiana Petroli; Societa Petrolifera Italiana.

Anglo - Mexican Petroleum Company; Compania de Gas y Combustible Imperial; Compania Mexicana de Gas, S. A.; Compania de Petroleo Mercedes, S. A., Compania Petrolera M y M, S. A.; Continental Oil Co. of Mexico, S. A.; Guaranty Oil Co., S. A.; Mexican Gulf Oil Co.; Mexican Sinclair Pet. Co., New England Fuel Oil Co.; Ohio Mexico Oil Co.; Pan American Petroleum Company; Penn Mex Fuel Co.; Petroleos de Mexico, S. A. (Petromex); Sabalo Transportation Co.; Sheldon Burden of Mexico, S. A.; Thomas Williams, Jr.

GROUP 29, includes:
Chantiers, B.R.P.M.; Societe Cheriennne des Petroles.

ast 10 Years

sequent years. Note:
s have been made.)

ngland	Czecho-slovakia	Sakhalin	Colombia	Iraq	Bolivia	Bahrein Island	Other Countries	Total World	Percent Produced by United States	YEAR
19,000	901,000	806,000	23,725,000	338,000	.....	.....	634,000	15,821,315,012	65.5	....Prior to 1928
1,000	94,000	677,000	19,897,000	713,000	.....	.....	15,000	1,324,774,000	68	1928
B	93,000	C1,134,000	20,385,000	798,000	E	.....	38,000	1,485,867,000	68	1929
B	157,000	C1,805,000	20,346,000	909,000	56,000	.....	40,000	1,411,905,000	64	1930
B	134,000	2,734,000	18,237,000	900,000	25,000	.....	54,000	1,373,656,000	62	1931
B	126,000	2,631,000	16,414,000	836,000	44,000	.....	62,000	1,309,677,000	60	1932
B	122,000	2,338,000	13,158,000	917,000	112,000	31,000	71,000	1,442,112,000	63	1933
B	178,000	2,881,000	17,341,000	7,689,000	159,000	285,000	96,000	1,522,243,000	59.7	1934
B	140,000	2,545,000	17,598,000	27,311,000	163,000	1,265,000	594,000	1,650,158,000	60.4	.....F1935
B	131,000	2,218,000	18,756,000	29,406,000	160,000	4,845,000	552,000	1,786,704,000	61.5	.....F1936
B	121,000	2,380,000	20,006,000	31,171,000	B	8,600,000	575,000	2,021,171,000	63.2	.....F1937
20,000	2,197,000	22,149,000	205,863,000	100,988,000	719,000	14,826,000	2,731,000	31,149,582,012	64.1	Total all years through 1937

e preliminary, having been estimated by THE OIL WEEKLY, with aid of government and other sources.

GREENLAND

GREENLAND

BAFFIN ISLAND

SOUTHAMPTON

Port Nelson Liverpool 3009 Mi.

PORT NELSON

PRINCE RUPERT

DOMINION OF CANADA

NORTH

VANCOUVER
VICTORIA

PORTLAND

AMERICA

UNITED STATES

QUEBEC

HALIFAX

NEWFOUNDLAND

New York Reykjavick

CAPE BRETON Is. Que. Liverpool 2747 Mi
N.Y. Hamb. 3620 Mi. 8-10 Days

N.Y. Southamp. 3095 Mi. 5-7 Days.
N.Y. Liverpool 3153 Mi. 7-10 Days.

NEW YORK

SAN FRANCISCO

New York 5694 Mi. to Gibraltar — 2850 Mi.

Atlantic

Bermuda

Liverpool

Texas Ports to Marseilles 5141 Mi.

Colon Liverpool 5837 Mi. 15-19 Days

Colon Gibraltar 5001 Mi.

Curacoa to Marseilles 4370 Mi.

Naples 5728 Mi. 14 Days

Naples - CANARY

4656 Mi.

HOUSTON

NEW ORLEANS

CORPUS CHRISTI

TAMPICO

MEXICO

Houston Colon N.Y. 1898 Mi. 7-8 Days

To N.Y. 2030 Mi.

WEST INDIES

CUBA

HAITI

JAMAICA

BR. HONDURAS

GUAT.

HOND.

NICARAGUA

SALVADOR

COSTA RICA

PANAMA

CARTAGENA

CURACOA

TRINIDAD

COLON

VENEZUELA

COLOMBIA

GUIANAS

ECUADOR

BELEM

Colon-5895-Mi.

Valparaiso

San Francisco-5

Panama

Cartagena

Texas Ports

Belem

Buenos Aires Southampton

Cape Town

7519 Mi.
6165 Mi.

SOUTH

BRAZIL

RIO DE JANEIRO

PARAGUAY

Rio De Janeiro

New York

Buenos Aires

URUGUAY

VALPARAISO

Brisbane Valparaiso 7403 Mi.

1h

Group 15

2i, V, W, X, Y, Z, ZZ

2f, ff, jj, rr, tt

1f

4g

Group 28

4u

2t

4d

2j

Group 20

2g, h, u

1g

4d, f, m

Group 43

Group 19

4, 4p

6, 6l

Group 22

Group 14

2d

Group 29

Group 40

Group 10

Group 17

2299

Group 42

SYMBOLS

ries *(outside the United States)* are indicated
ame of the company or companies, and are
low:

n Company, Ltd.
t Company is an

Maatschappij is
ral Dutch Shell

atschappij is a

PANY, LTD.

y of India, Ltd.
Oil Share Trust,

rio-Iranian Oil

Shell Oil Stor-
ompany of India,
l Trading &

GROUP 19, includes:
Methan Spolecnost pro tezbu Plynu; Apoll-o Rafinerie Mineralnich Oleju; Czechoslovakia Republic; Stat, Naft, Doly.

GROUP 20, includes:
Anglo-Ecuadorean Oilfields, Ltd.; Ecuador Oilfields, Ltd.

GROUP 21, includes:
Compagnie Francaise des Petroles; Fechelbronn Oil Co.

GROUP 22, includes:
Bohrverwaltung; Schachtbau Thyssen, G.m.b.H.

GROUP 23, includes:
J. D. Cotaldis.

GROUP 24, includes:

North Sakhalin Oil Co.; Taiwan Mining Co., Ltd.

GROUP 27, includes:
Compagnie Francaise des Petroles.

GROUP 28, includes:
Anglo - Mexican Petroleum Company; Compania de Gas y Combustible Imperio; Compania Mexicana de Gas, S. A.; Compania de Petroleo Mercedes, S. A., Compania Petrolera M y M, S. A.; Continental Oil Co. of Mexico, S. A.; Guaranty Oil Co., S. A.; Mexican Gulf Oil Co.; Mexican Sinclair Pet. Co., New England Fuel Oil Co.; Ohio Mexico Oil Co.; Pan American Petroleum Company; Penn Mex Fuel Co.; Petroleos de Mexico, S. A. (Petromex); Sabalo Transportation Co.; Sheldon Burden of Mexico, S. A.; Thomas Williams, Jr.

GROUP 29, includes:

any (6 holds 23% rough da).
mpany.
mpany.
bale oil produc-

y Comercial de

oleum Syndicate is

jointly controlled
ico Petroleum Syn-

OIL COMPANY,

el, A. G., Hamburg.
ey, S.A. Szechowico.
ny, Ltd., (11%

NORTH EAST ISLAND
SVALBARD
KING CHARLES IS.
FRANZ JOSEF LAND
WEST SPITSBERGEN
SOUTH CAPE
Barents Sea
JAN MAYEN
New York Arkangelsk
ICELAND
REYKJAVICK
Reykjavick Oslo 1250 Mi.
ARKHANGELSK
OSLO
STOCKHOLM
SWEDEN
FINLAND
UNION OF SOCIALISTIC SOVIET REPUBLICS
(R U S S I A)
ESTONIA
LAT VIA
LITH
IRISH FREE STATE
LIVERPOOL
LONDON
SOUTHAMPTON
GREAT BRITAIN
HAMBURG
GERMANY
POLAND
FRANCE
GENOVA
MARSEILLES
BARCELONA
CORSICA
SARDIN
SPAIN
GIBRALTAR
Gibraltar Port Said
SICILY
Mediterranean Sea
ROMANIA
YUGO-SLAVIA
BULGARIA
ASIA MINOR
SYRIA
IRAQ
IRAN
AFGHANISTAN
TURKESTAN
A S I A
MOROCCO
ALGERIA
LIBYA
EGYPT
PORT SAID
ARABIA
DELHI
BALUCHISTAN
INDIA
Calcutta
BOMBAY
RIO DE ORO
FRENCH WEST AFRICA
FRENCH SUDAN
SENEGAL
UPPER VOLTA
NIGERIA
IVORY COAST
(Br.) GOLD CST.
DAHOMEY
LIBERIA
SIERRA LEONE
ANGLO-EGYPTIAN SUDAN
ERITREA
ADEN
Port Said
Bombay 3500 Mi.-10-Days
Arabian Sea
8425-Mi.
BR. SOMALILD.
ETHIOPIA
MOGADISHU
ITALIAN SOMALILAND
BAHREIN ISLAND
COLOMBO
KENYA
Zanzibar Bombay
CAMEROONS
FRENCH EQUATORIAL AFRICA
BELGIAN CONGO
KABINDA
TANGANYIKA
ZANZIBAR
DARES SALAAM
TERRIT (Br.)
ST. HELENA
Southampton
SOUTHWEST AFRICA
BECHUANALAND (Br.)
SOUTH RHODESIA (Br.)
UNION OF SOUTH AFRICA
DURBAN
Cape Town 3769 Mi.-10-Days
Indian Ocean
Group 2m
Group 4a
Group 6e
Group 2o
Group 76, h
Group 33
Group 35
Group 36
Group 19
Group 14
Group 21
Group 10
Group 25
Group 27
Group 34
Group 37
Group 38
Group 41
Group 45
Group 1z
Group 1l
Group 2p
Group 7e
Group 5d
Group 4o
Group 3d
Group 6d
Group 3e
Group 6b
Group 1a,b,k
Group 1a,b
Group 3b,c,d
Group 2l
Group 4,4l,q
Group 7a

LEGEND

Group 28 — SEE EXPLANATION UNDER KEY TO FLAG SYMBOLS.

⊕ — COUNTRIES IN WHICH EXPLORATORY DRILLING IS PLANNED FOR 1938.

○ — EXPLORATORY DRILLING CURRENT IN 1937 IN THIS COUNTRY.

● — COMMERCIAL PRODUCTION ESTABLISHED IN 1937 IN THIS COUNTRY.

▲ — COUNTRIES WITH COMMERCIAL PRODUCTION ESTABLISHED PRIOR TO 1937.

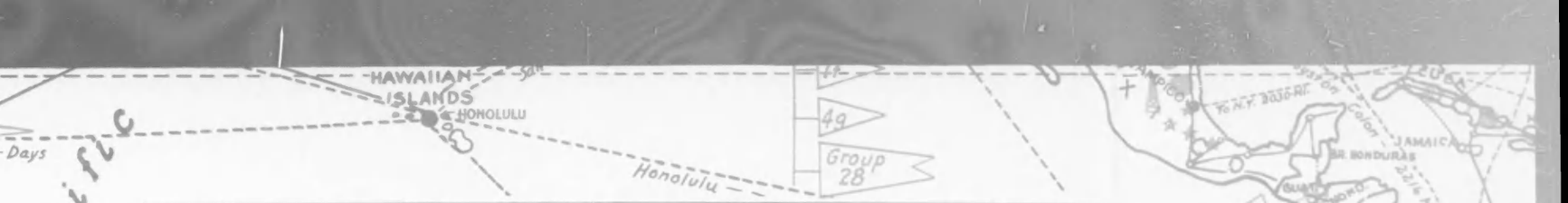
— ESTABLISHED AIR LINES.

--------- STEAMSHIP AND TANKER ROUTES.

★ — OIL REFINERIES.

0 5001 10001

APPROXIMATE SCALE OF MILES AT EQUATOR.



KEY TO FLAG SYMBOLS

The principal operating companies in different countries *(outside the United States)* are indicated by flags. The letters within the flags represent the name of the company or companies, and are explained below:

1. STANDARD OIL COMPANY OF CALIFORNIA

a. Bahrein Petroleum Company, Ltd.
b. California Arabian Standard Oil Company.
c. California Standard Oil Company of Mexico.
d. N.V. Nederlandsche Pacific Petroleum Maatschappij.
e. Richmond Petroleum Company of Colombia.
f. Richmond Petroleum Company of Mexico, S. A.
g. Richmond Petroleum Company of Venezuela.
h. Standard Oil Company of British Colombia.
i. California Standard Oil Company, Ltd.
j. 20 percent interest in N.V. Nederlandsche Nieuw Guinea Petroleum Maatschappij held by ld.
k. 50 percent interest in The California Texas Oil Company.

2. STANDARD OIL COMPANY OF NEW JERSEY

c. Compagnie General des Petroles.
d. Compagnie Standard Franco Americaine and subsidiaries.
e. Compania Nacional de Petroleo, Ltd.
f. Compania Transcontinental de Petroleo, S. A.
ff. Mexican Petroleum Company.
g. Creole Petroleum Corporation.
gg. Deutsche Amerikanische Petroleum Gesellschaft.
h. Standard Oil Company of Venezuela.
i. Imperial Oil Company, Ltd.
j. International Petroleum Company.
jj. Huasteca Petroleum Company.
k. N.V. Nederlandsche Koloniale Petroleum Maatschappij.
kk. Half owner of Standard Vacuum Company in Far East.
l. Near East Development Corporation.
m. Romano Americana.
mm. Half interest in 40 percent of N.V. Nederlandsche Nieuw Guinea Petroleum Maatschappij through 2kk.
n. Societa Italo Americana del Petrolio and subsidiaries.
nn. Trinidad Oilfields Operating Company, Ltd.
o. Standard Nobel Company.
p. Standard Oil & Refining Company.
q. Standard Oil Company of Argentina.
r. Standard Oil Company of Bolivia.
rr. Tamiahua Petroleum Company.
s. Standard Oil Company of Peru.
t. Tropical Oil Company.
tt. Tuxpan Petroleum Company.
u. Lago Petroleum Corporation.
v. Dalhousie, Ltd.
w. Foothills Oil & Gas Company, Ltd.
x. Northwest Company, Ltd.
y. Royalite Oil Company, Ltd.
z. European Gas & Electric Company.
zz. Southwest Petroleum, Ltd.

3. THE TEXAS CORPORATION

a. South American Gulf Oil Company, jointly controlled with Socony-Vacuum Corporation.
b. Bahrein Petroleum Company (Half Interest).
c. California Arabian Standard Oil Company (Half Interest).
d. 50 percent interest in the California Texas Oil Company
e. Owns 30 percent interest in Seaboard Oil Company of Delaware, which is parent company of Inland Exploration, which has exclusive concession in practically all of Afghanistan.

4. ROYAL DUTCH SHELL COMBINE

Composed of: Shell Transport and Trading Company, Ltd., and Royal Dutch Company for the Working of Petroleum Wells in the Netherlands Indies, or N.V. Koninklijke Nederlandsche Maatschappij Tot Exploitatie Van Petroleumbronnen in Nederlandsche-Indie.

a. Astra Romana (Roumanian).
b. De Bataafsche Petroleum Maatschappij.
bb. N.V. Nederlandsche Nieuw Guinee Petroleum Maatschappij (40 percent interest held by 4b).
c. British Malayan Petroleum Company.
cc. United British Oilfields of Trinidad, Ltd.
d. Caribbean Petroleum Company.
e. Ceram Oil Syndicate, Ltd., Properties leased to Royal Dutch.
ee. N.V. Boela Petroleum Maatschappij.
f. Colon Oil Corp.
g. Compania Mexicana de Petroleo "El Aguila", S.A.
h. Diadema, S.A.
i. Iraq Petroleum Company, holds 23¾ percent interest through 4q.
j. N.V. Tarakan Petroleum Maatschappij.
k. Nederlandsche-Indische Aardolie Maatschappij.
l. Sarawak Oilfields, Ltd.
m. Venezuelan Oil Concessions, Ltd.
n. Half owner Austrian Crude Oil Exploitation Company.
o. Anglo-Egyptian Oilfields, Ltd.
p. Rhenania-Ossag Mineraloelwerke.
q. Anglo-Saxon Petroleum Company, Ltd.
r. Papua Oil Development Company is an affiliate of Shell.
s Algemeene Exploratie Maatschappij is an affiliate of Royal Dutch Shell Combine.
t. N.V. Oost-Borneo Maatschappij is a Shell affiliate.
u. Shell de Guatemala.

5. BURMAH OIL COMPANY, LTD.

a. Assam Oil Co., Ltd.
b. The Tin Plate Company of India, Ltd.
c. B.O.C. Anglo-Iranian Oil Share Trust, Ltd.
d. Interest held in Anglo-Iranian Oil Company, Ltd.
e. Interest held in Burmah Shell Oil Storage Distributing Company of India.
f. Interest held in Shell Trading & Transport Company, Ltd.

6. ANGLO IRANIAN OIL COMPANY, LTD.

a. D'Arch Exploration Company, Ltd.
aa. North Iranian Oils, Ltd., Sub of 6a.
b. Kermanshah Pet. Co.
c. Khanaquin Oil Company, Ltd.
d. Kuwait Oil Company, Ltd., owned jointly with Gulf.
e. Steau Romana, Ltd.
f. Iraq Petroleum Company (6 holds 23¾ percent interest through 6a).
g. Anglo-Iranian Oil Company.
h. Anglo-Iranian Oil Company.
i. Scottish Oils, Ltd. (shale oil production).
j. Compania Industrial y Comercial de Petroleo, S. A.
k. British Borneo Petroleum Syndicate is an associate.
l. Nordic Oil Company jointly controlled with British Borneo Petroleum Syndicate.

7. SOCONY-VACUUM OIL COMPANY, INC.

a. Deutsch Vacuum Oel, A. G., Hamburg.
b. Vacuum Oil Company, S.A. Szechowice.
c. Near East Development Corp. (11⅞ interest in Iraq Pet. Co.)
d. Half owner of Standard Vacuum Company in Far East, combining marketing business of Socony-Vacuum with Far East production of S. of N. J.
e. Half owner of Austrian Crude Oil Exploitation Company.
f. South American Gulf Oil Company, jointly controlled with The Texas Co.
g. Islands Exploration Company, Ltd.
h. Pioneer Oil Company (Poland) part interest held by Socony Vacuum Corp.
i. Half interest in N.V. Nederlandsche Nieuw Guinee Petroleum Maatschappij through 7d.

GROUP 8, includes:
Chilkat Oil Company; Inlskin Drilling Company.

GROUP 9, includes:
Azienda Generale Italiana Petroli, Syndicat Franco-Albanais; Azienda Italiana Petrolia Albania.

GROUP 10, includes:
Societe Algerienne de Petroles de Tilouanet.

GROUP 11, includes:
Compania de Petroleo de Angola.

GROUP 12, includes:
Argentine Government Oil Fields (Y.P.F.); "Astra" Cia Compania de Petroleo, S. A.; Ultramar, S. A. Pet. Argentina.

GROUP 13, includes:
South Australian Oil Wells Co.; Oil Search, Limited & sub, Drillers, Ltd.; Western Petroleum, N. L.; C. O. Shave; Australian Roma Oil Co.; Roma Oil Corp.; Freney-Kimberley Oil Co.; Belford Dome, Ltd.

GROUP 14, includes:
Rohoel Gewinnungs, A. G.

GROUP 15, includes:
Abasand Oils, Ltd.; Ajax Oil & Gas Co., Ltd.; Altoba Gas Exploration Co., Ltd.; British Dominion Oil & Development Corp.; Calgary & Edmonton Corporation; Canadian Natural Gas Syndicate; Central Butte Exploration Drillers; Colony Oil & Gas Co.; Dominion Petroleum Company; Gas & Oil Products, Ltd.; Hargal Oils, Ltd.; B. Jasperson; Lloydminster Gas Co., Ltd.; Mar Jon Oil Co.; Maxmont Oil Co.; Petrol Oil & Gas Co., Ltd.; Riverhurst Oil & Gas Co., Ltd.; S. W. S. Drilling Co., Ltd.; Charles A. Simpson; Southern Ontario Gas Co., Ltd.

GROUP 16, includes:
Chinese Government.

GROUP 17, includes:
Colombian Petroleum Company.

GROUP 18, includes:
Compania Minera San Elias, S. A.; Motembo Mining Co., S. A.; Union Oil Co., S. A.; Atlantic Refining Co. of Cuba; Compania Naptalifera El Rosario, S. A.; The St. John Naphtha Co., Inc.

GROUP 19, includes:
Methan Spolecnost pra tezbu Plynu; Apollo Rafinerie Mineralnich Oleju; Czechoslovakia Republic; Staf. Nafl. Doly.

GROUP 20, includes:
Anglo-Ecuadorean Oilfields, Ltd.; Ecuador Oilfields, Ltd.

GROUP 21, includes:
Compagnie Francaise des Petroles; Pechelbronn Oil Co.

GROUP 22, includes:
Bohrverwaltung; Schachtbau Thyssen, G.m.b.H.

GROUP 23, includes:
J. D. Colaitis.

GROUP 24, includes:
Attock Oil Company; British Burmah Petroleum Co.; Indo-Burma Oilfields, Ltd; Pyinna Development Co.

GROUP 25, includes:
Azienda Generale Italiana Petroli; Societa Petrolifera Italiana.

GROUP 26, includes:
Nippon Oil Co.; Nihon Sekigu Kaisha; North Sakhalin Oil Co.; Taiwan Mining Co., Ltd.

GROUP 27, includes:
Compagnie Francaise des Petroles.

GROUP 28, includes:
Anglo-Mexican Petroleum Company; Compania de Gas y Combustible Imperio; Compania Mexicana de Gas, S. A.; Compania de Petroleo Mercedes, S. A., Compania Petrolera M y M, S. A.; Continental Oil Co. of Mexico, S. A.; Guaranty Oil Co., S. A.; Mexican Gulf Oil Co.; Mexican Sinclair Pet. Co., New England Fuel Oil Co.; Ohio Mexico Oil Co.; Pan American Petroleum Company; Penn Mex Fuel Co.; Petroleos de Mexico, S. A. (Petromex); Sabalo Transportation Co.; Sheldon Burden of Mexico, S. A.; Thomas Williams, Jr.

GROUP 29, includes:
Chantiers, B.R.P.M.; Societe Cheriienne des Petroles.

GROUP 30, includes:
Oil Search Limited.

GROUP 31, includes:
Moruroa Oil Fields, Ltd.; Taranaki Petroleum Company; Blenheim Company.

GROUP 32, includes:
Compania Petrolera Lobitos (Lobitos Oilfields, Ltd.); F. G. Pisggio & Sons; Blue Goose Oil Co.

GROUP 33, includes:
Galicia Oil Co.; Gazy Ziemne O. & N. Gas Co., Ltd.; Malopolska Oil Co.; "Pioneer" Bituminous Minerals Exploring and Exploiting Co., Ltd.; Polmin Oil Co.; Schmer Oil Co.; C. Zaluski.

GROUP 34, includes:
Inyaminga Petroleum, Ltd.

GROUP 35, includes:
Colombia Soc. Franco Roumaine de Petrole; Concordia Oil Company; Creditul Minier, S.A.R.; Industria Romana de Petrol; S.A.R. de Gas Metan (Fosta U.E.C.); Unirea Soc. Anon. Romana de Petrol.

GROUP 36, includes following oil trusts
Azneftesavody; Bashieft; Embaneft; Giavneft; Grozneft; Maineft; Middle Asiatic Petroleum Trust; Sokolien-Neft; Westoknefl.

GROUP 37, includes:
Spanish Petroleum Monopoly is known as Compania Arrendataria Del Monopolio de Petroles, S. A. ("Campsa"); Compania Espanolas des Petroleos.

GROUP 38, includes:
Aktiebolaget Electrisk Malmletning.

GROUP 39, includes:
Timor Petroleum Company.

GROUP 40, includes:
Antilles Petroleum Company; Apex (Trinidad) Oilfields, Ltd.; Kern Trinidad Oilfields, Ltd.; New Dome Oilfields, Ltd.; Trinidad Central Oilfields, Ltd.; Trinidad Investments, Ltd.; Trinidad Leaseholds, Ltd.; Trinidad Petroleum Development Co.

GROUP 41, includes:
Enstitusu Petrol Arama Gurubu.

GROUP 42, includes:
Admn. Nacional de Combustibles, Alcohol y Portland.

GROUP 43, includes:
Caracas Petroleum Corporation; Venezuelan Gulf Oil Company; Venezuela Petroleum Company.

GROUP 44, includes:
Autonomous Management of Monopolies of Yugoslavia.

GROUP 45, includes:
Inland Exploration Co.

GROUP 46, includes:
Skelly Oil Co.

G SYMBOLS

ntries *(outside the United States)* are indicated
name of the company or companies, and are
below:

eum Company, Ltd.
ent Company is an

ie Maatschappij is
Royal Dutch Shell

Maatschappij is a

MPANY, LTD.

pany of India, Ltd.
n Oil Share Trust,

Anglo-Iranian Oil

mah Shell Oil Stor-
Company of India.
Shell Trading &
ny, Ltd.

OIL COMPANY,

Company, Ltd.
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OIL COMPANY,

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, combining mar-
Socony - Vacuum
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ian Crude Oil Ex-
y.
lf Oil Company,
vith The Texas Co.
Company, Ltd.
y (Poland) part
Socony Vacuum

V. Nederlandsche
Petroleum Maat-
d.

Iniskin Drilling

ana Petroli, Syn-
Azienda Italiana

etroles de Tilcua-

e Angola.

l Fields (Y.P.F.);
e Petroleo, S. A.;
rgentina.

Wells Co.; Oil
, Drillers, Ltd.;
L.; C. O. Shave;
Co.; Roma Oil
Oil Co.; Belford

).

x Oil & Gas Co.,
ration Co., Ltd.;
& Development
ton Corporation;
ndicate; Central
rs; Colony Oil &
oleum Company;
d.; Hargal Oils,
oydminster Gas
o.; Maxmont Oil
o., Ltd.; River-
; S. W. S. Drill-
Simpson; South-

mpany.

lias, S. A.; Mo-
Union Oil Co.,
r Co. of Cuba;
Rosario, S. A.;
., Inc.

GROUP 19, includes:
Methan Spolecnost pro tezbu Plynu; Apoll- Rafinerie Mineralnich Oleju; Czechoslovakia Republic; Stat. Naft. Doly.

GROUP 20, includes:
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GROUP 21, includes:
Compagnie Francaise des Petroles; Pechelbronn Oil Co.

GROUP 22, includes:
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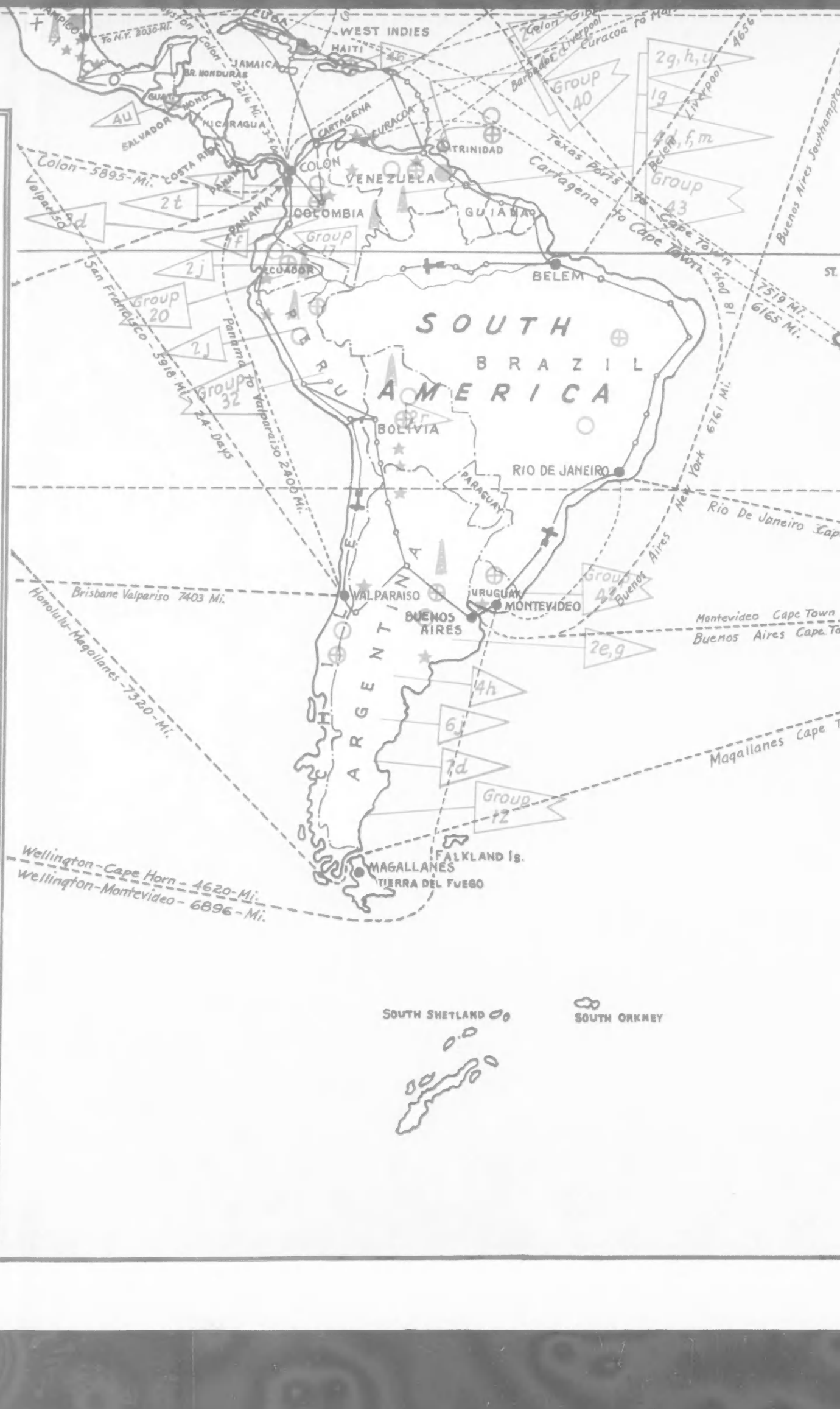
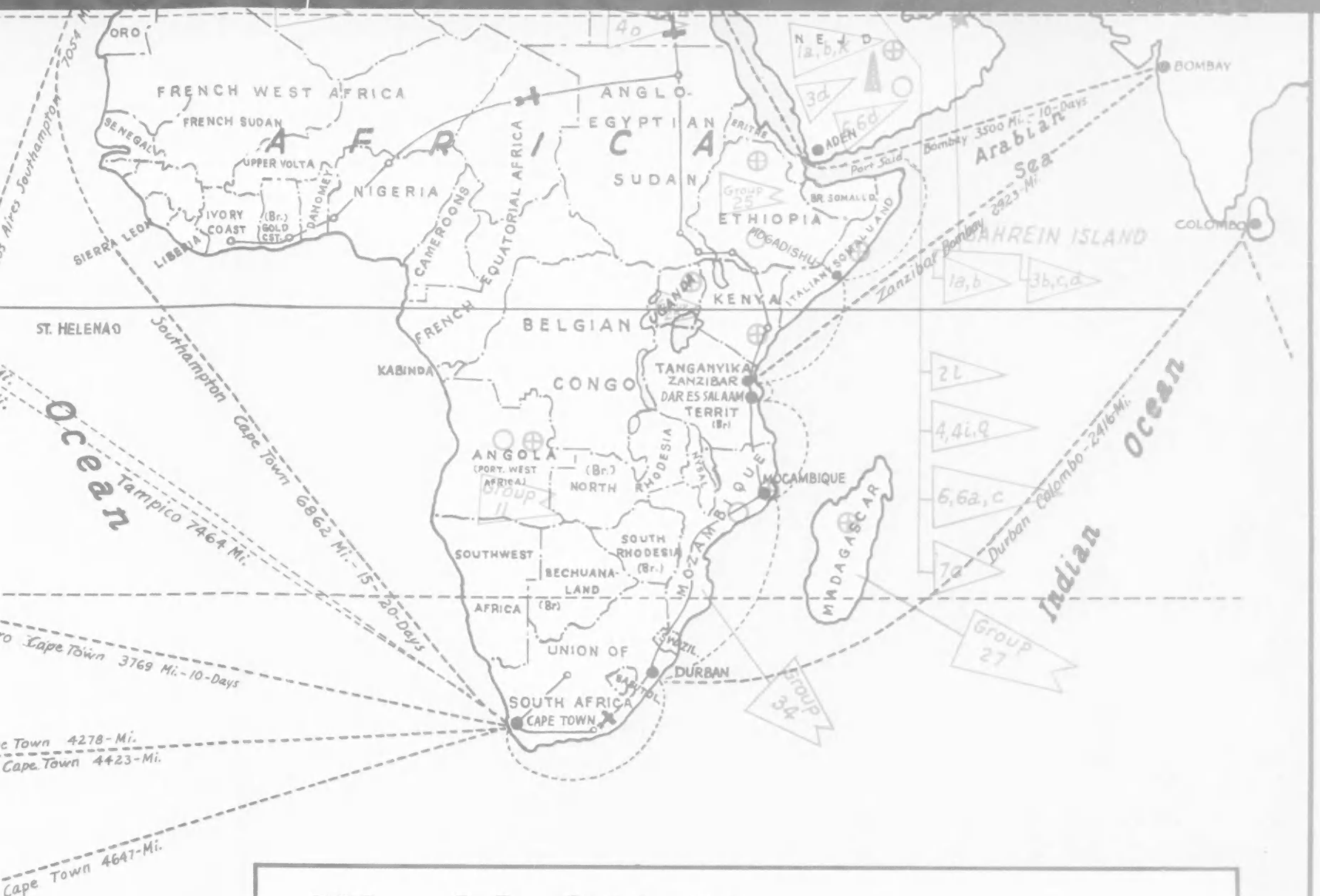
Skelly Oil Co.





World Oil Map

of Activity Outside the United States

Showing what countries produce and are drilling for oil, location of refineries, companies operating in various nations, and principal steamship and airplane routes.

Insert Supplement to

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INTERNATIONAL NUMBER

FEBRUARY 21, 1938